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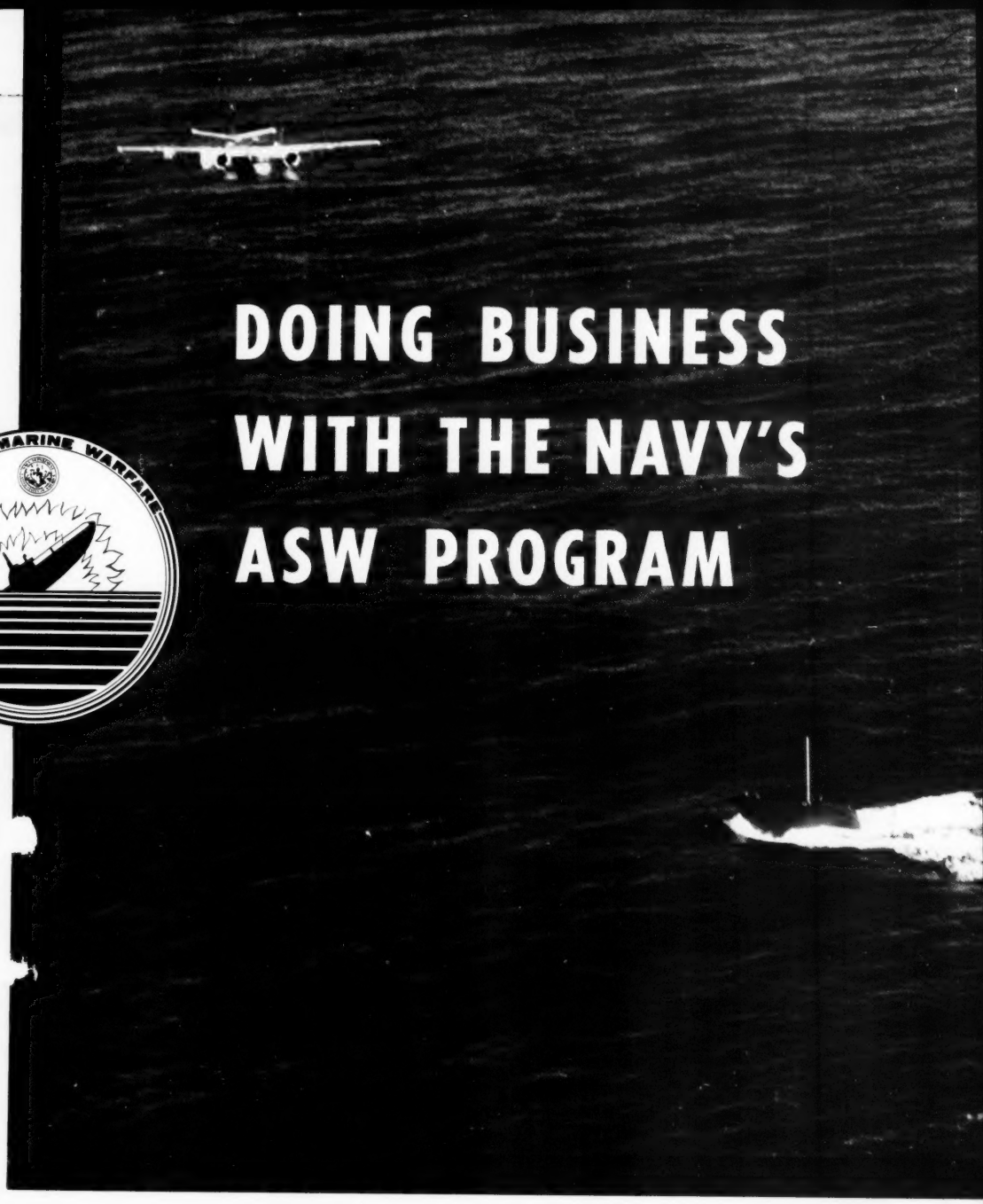

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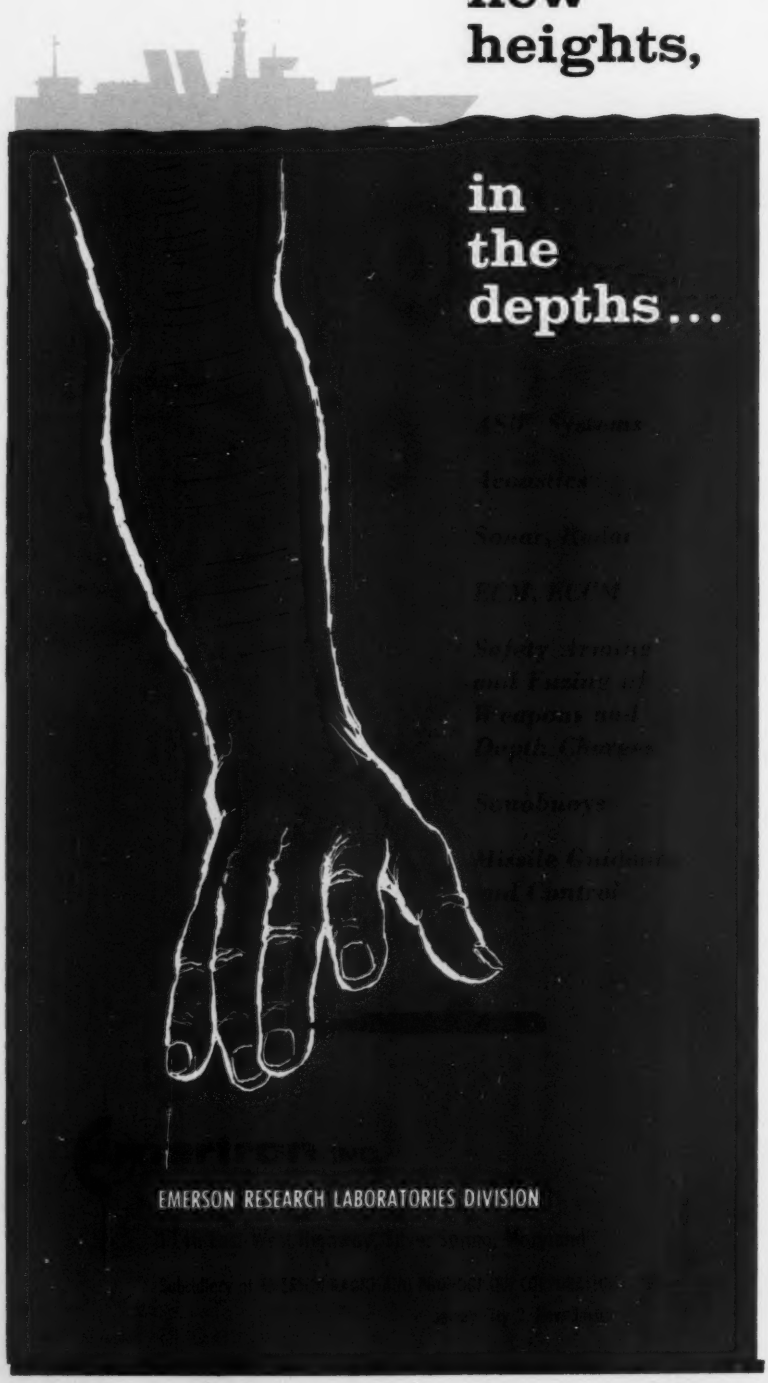

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JULY 1960 COVER

Grumman S2F TRACKER from the USS PHILIPPINE SEA (CVS-47) makes a run on the periscope of the USS BASHER (SSR-269) during training exercises conducted during ASW Operation OCEANLINK.

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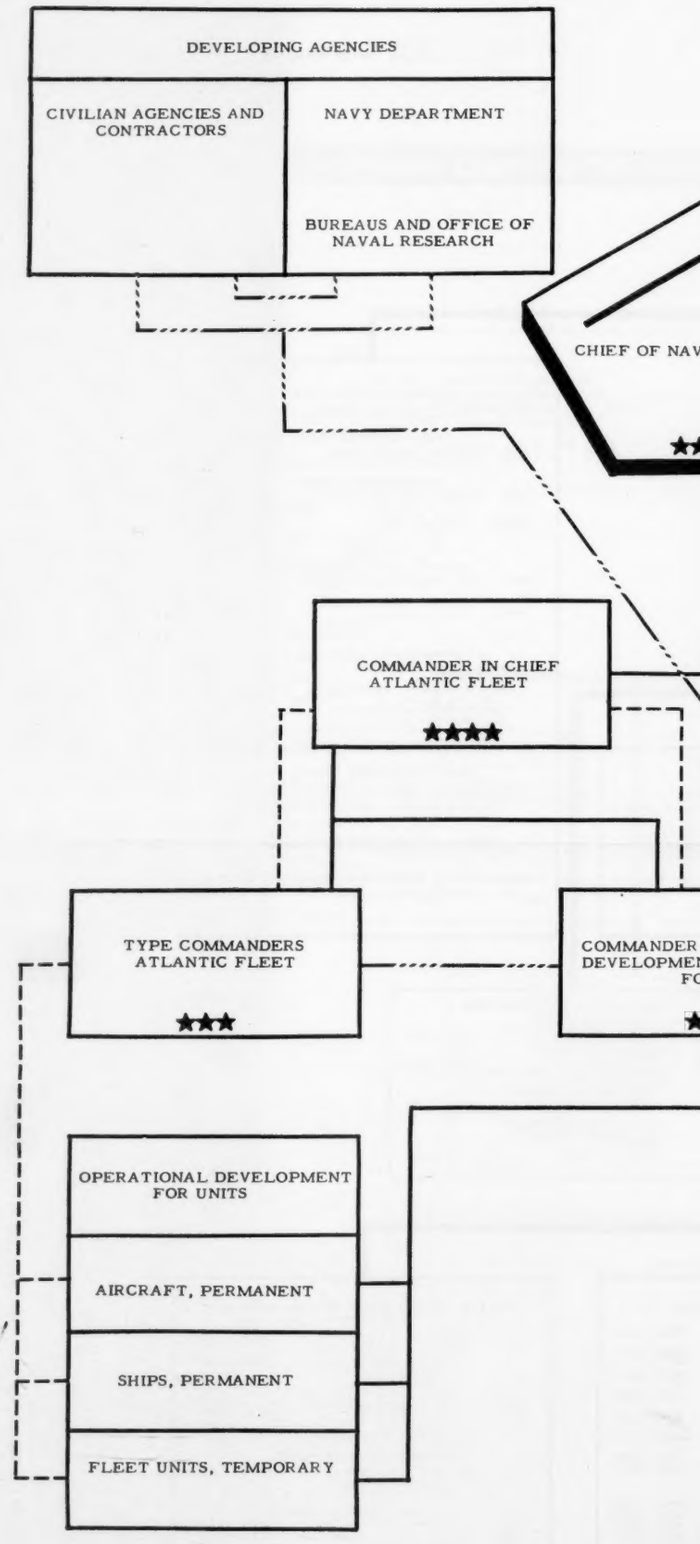

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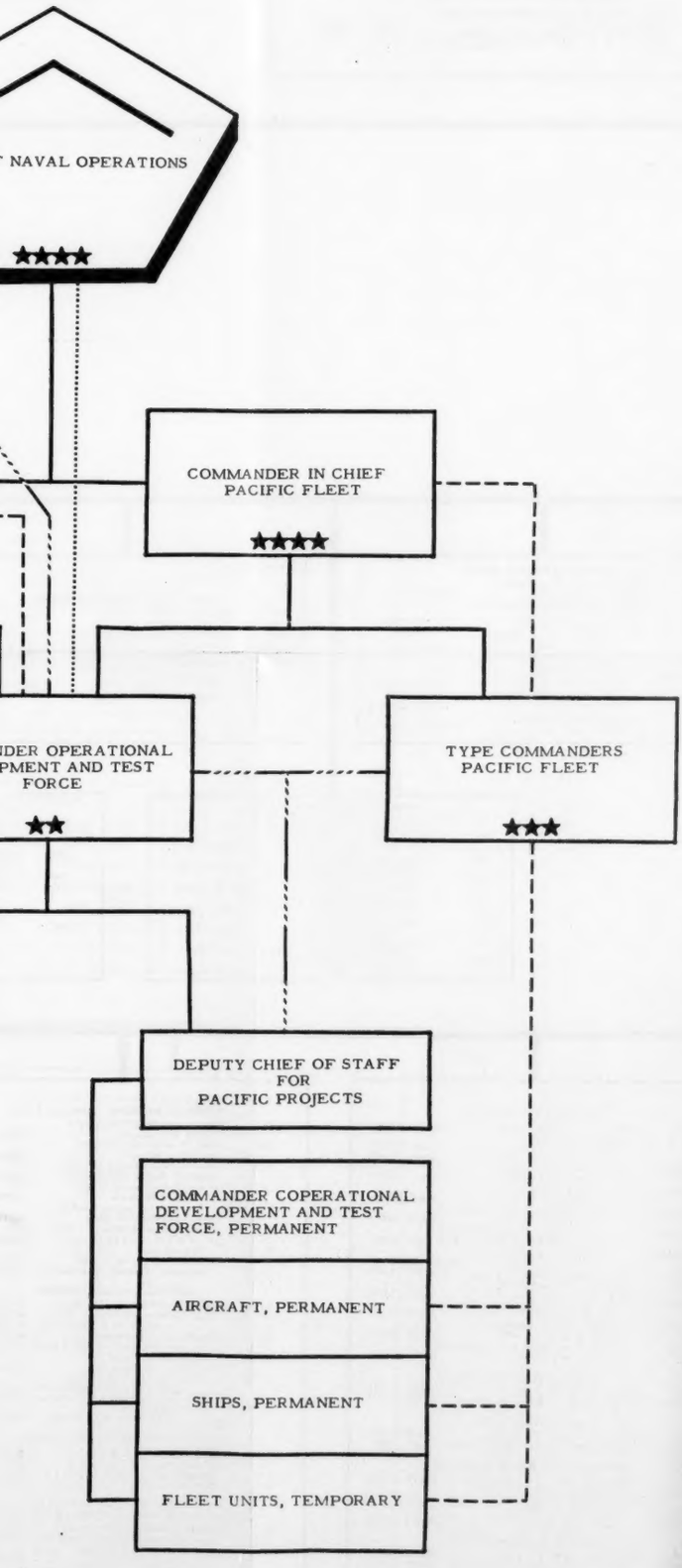

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DATA magazine would like to express its appreciation to all the members of the U. S. Naval Establishment who aided us in the preparation of this special ASW edition.

We would like to especially credit Squadron VX-1 with the basic seal used to exemplify ASW. As the Navy has no one ASW emblem, we borrowed the seal of Squadron VX-1 and with slight changes used it throughout this book. In our judgement it was the emblem which most typified the ASW mission.

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NEXT MONTH IN DATA

The August issue of DATA will feature the Navy Astronautics Program.

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LETTERS FROM READERS

Dear Mr. Smith:

I was impressed by the fine job your staff has done in putting together the Ordnance section of DATA magazine. My appreciation for this splendid feature goes to you and to all those of your staff whose diligence and industry made it possible. I hope you will pass along to them my thanks for a job well done.

Harry W. Craig
Lt. Col., Ordnance Corps
Technical Liaison Officer

Ed.—It was a real pleasure to work with you and your fine outfit, Colonel.

* * * *

Gentlemen:

As a recent subscriber to your magazine, I find it helpful and valuable in determining the marketing requirements of the various military agencies.

I am presently undertaking a study of the Anti-Submarine Warfare market, and it occurred to me that you may have some pertinent data. Should you have such information concerning this relatively unknown market, I would greatly appreciate your forwarding it to me at your earliest convenience.

James T. Parry
Marketing Research
Hughes Aircraft Company
Fullerton, California

P.S.—Your edition of DATA entitled "Doing Business with NASA" was received but has been "stolen" by one of my associates (anyway I can't locate it). If it is not too much trouble—and if you have an extra issue—perhaps you could send me another. From now on I'll keep my DATAs under lock and key.

Ed.—We sent the extra issue gratis and hope you find this DATA ASW issue of value, Jim.

* * *

Gentlemen:

When visiting the Sacramento Signal Depot of the U.S. Army Signal Corps recently, we were presented with a copy of DATA for September 1959. This excellent issue contains a complete and apparently very accurate listing of all Signal Corps activities, and it has already proved to be extremely useful to us.

The magazine masthead shows that you have projected issues later in 1959 and early in 1960, covering several other U.S. Government agencies concerned with defense activities. Each of these will be of great use and interest to us. We are doing business with the Army Ordnance Corps, the Air Force, ARDC, the Bureau of Naval Weapons, and others.

We shall greatly appreciate your furnishing information on how we may obtain these back issues, also a subscription to your excellent publication. Please also furnish us with a rate card and analytic data; this material should also go to our advertising agency (Erwin Wasey, Ruthrauff & Ryan, 140 Montgomery Street, San Francisco, California).

Thank you in advance for your cooperation in this matter. We wish to compliment you again on the excellent presentation made in your last September issue.

Robert E. Krueger
Vice President—Sales
Advanced Instrument Corporation
Richmond, California

Ed.—We thank you for the nice words, Mr. Krueger, and believe you will find our current issues even more useful than our 1959 editions.

* * * *

Dear Mr. Smith:

I am writing to inquire whether DATA magazine would be interested in working with this office on a special issue to be devoted to Western Germany, emphasizing the defense relationship with the United States.

I would suggest for a title, "U.S.A.-Germany, Partnership for Defense" and a table of contents which would feature, among other things, personal messages from Chancellor Konrad Adenauer, the German Foreign Minister Dr. Heinrich von Brentano, from former U. S. Military Governor General Lucius Clay, former High Commissioner and president of the Chase-Manhattan Bank Hon. John J. McCloy, and military leaders of the West German Government.

I am confident that such a special issue would not only attract considerable interest, but also advertising justification.

I look forward to hearing from you.

Arthur Settel
Director, International Division
Julius Klein Public Relations, Inc.

Ed.—We could tie it in or use it as our planned November 1960 Mutual Security Program issue. What do readers think of the idea?

DATA 1961 SCHEDULE

January	Air Research & Development Command (ARDC)
February	Bureau of Naval Weapons (BuWeps)
March	National Aeronautics & Space Administration (NASA)
April	Federal Aviation Agency (FAA)
May	Bureau of Ships (BuShips)
June	Air Materiel Command
July	Navy Anti-Submarine Warfare (ASW) Program
August	Air Force Electronics Program
September	Army Signal Corps
October	Army Transportation Corps
November	Army Ordnance Corps
December	Department of Defense Annual

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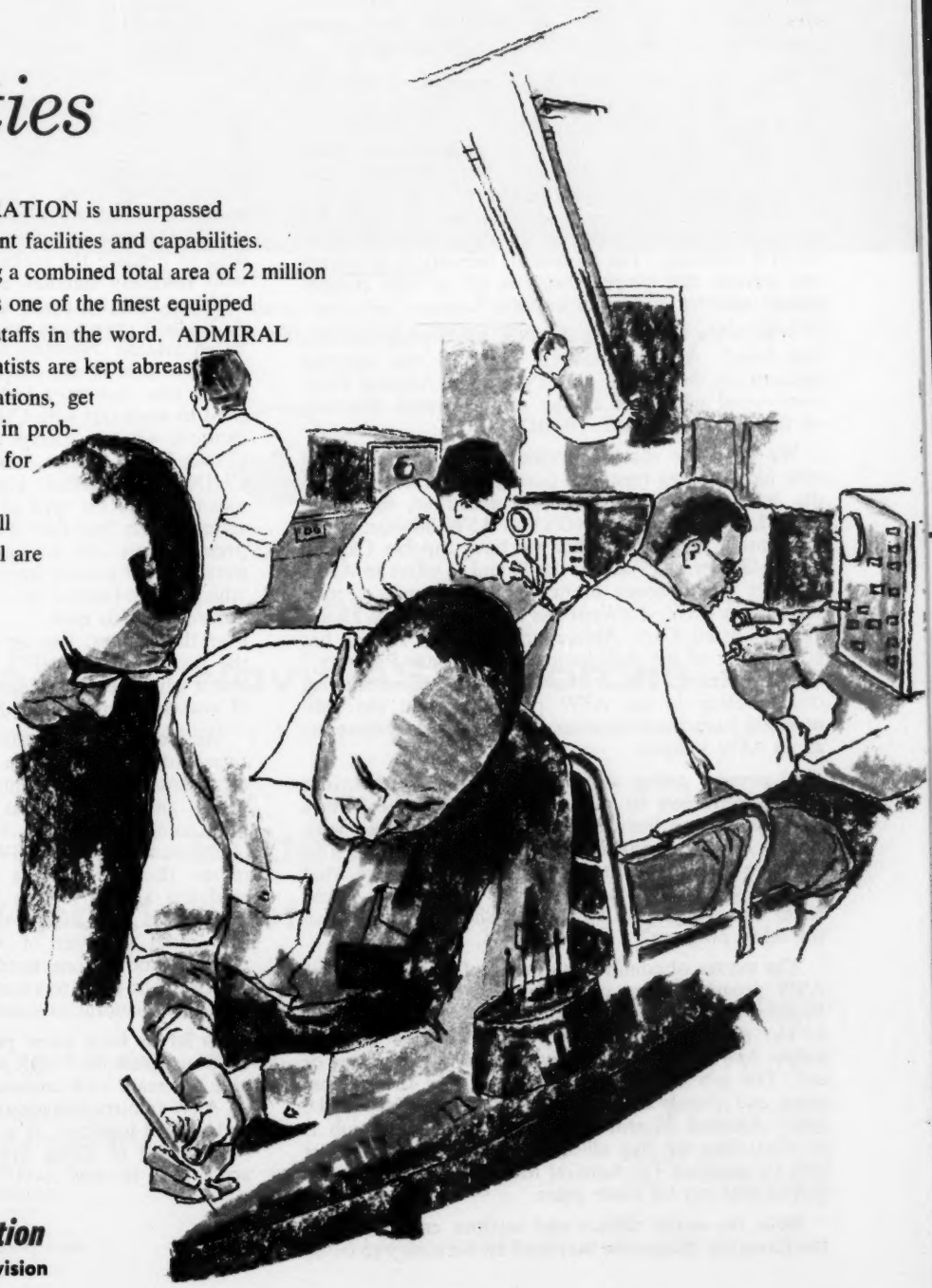

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Chicago 47, Illinois

Feature Editorial

WHO'S RUNNING THE SHOW?

As a former member on an ASW unit, Squadron VX-1, Key West, and with another duty tour up in the Pentagon as a CHINFO (Navy Chief of Information) information officer—where I conceived DATA magazine just about four years ago—I have a few words that I believe should be said about this Navy ASW picture by someone not afraid to speak the truth.

Many men vitally interested in solving the problem of "how to beat the sub" are not satisfied with the Navy's ASW organization. Proposals to establish a POLARIS-management type of set-up have been turned down by Navy officials as not being suited for so broad a problem. Nevertheless, it is apparent that the present organization is so unwieldy, scattered and subject to constant change of personnel that the ASW effort is suffering. The problem is too serious to permit any answer that simply shrugs it off as "too complicated" and "let it slide the way it is."

Who is the top man in the POLARIS program—the real boss? Admiral Raborn. Who is the supreme authority in the nuclear power program? Admiral Rickover. And who is in charge of the overall direction of the ASW program? NOBODY!

We have the recently formed ASW Committee of *nine* high-ranking members headed by the Secretary of the Navy. The ASW readiness executive, Rear Admiral L. H. Mustin is CNO's top ASW advisor. Over in Admiral Hayward's office we have capable Captain W. H. Groverman running the R and D effort in ASW. BuShips has a sonar branch and electronics section working in ASW. BuWeps has a section, has an "ASW Officer" listed, Capt. Abhau, and the same Bureau has a "Director of the Anti-Submarine Warfare Program," Capt. McKeller. The aviators have their representative concentrating in air ASW programs, and the submariners have their top man working on the submarine as an ASW weapon.

A person going around the Navy Department or the Pentagon to get information on the Navy's ASW problems becomes completely confused with such a scattered and uncoordinated program. Too often we find that one section is not familiar with what another group is doing in closely allied fields. And never can we get the answer—"Who is in charge of the ASW program?"

The matter of continual turnover of personnel in the ASW program is an unavoidable part of the Navy's rotation system. But, *if the ASW program is so vital to this nation's security, why do we change top key people like the ASW Executive for CNO every year or so?* The job has been in existence only about three years and already we are seeing our third officer in the post—Admiral Mustin. If this ASW executive job is so vital, then the flag officer assigned to it should not only be qualified (as Admiral Mustin is) but he should stay in that job for *three* years.

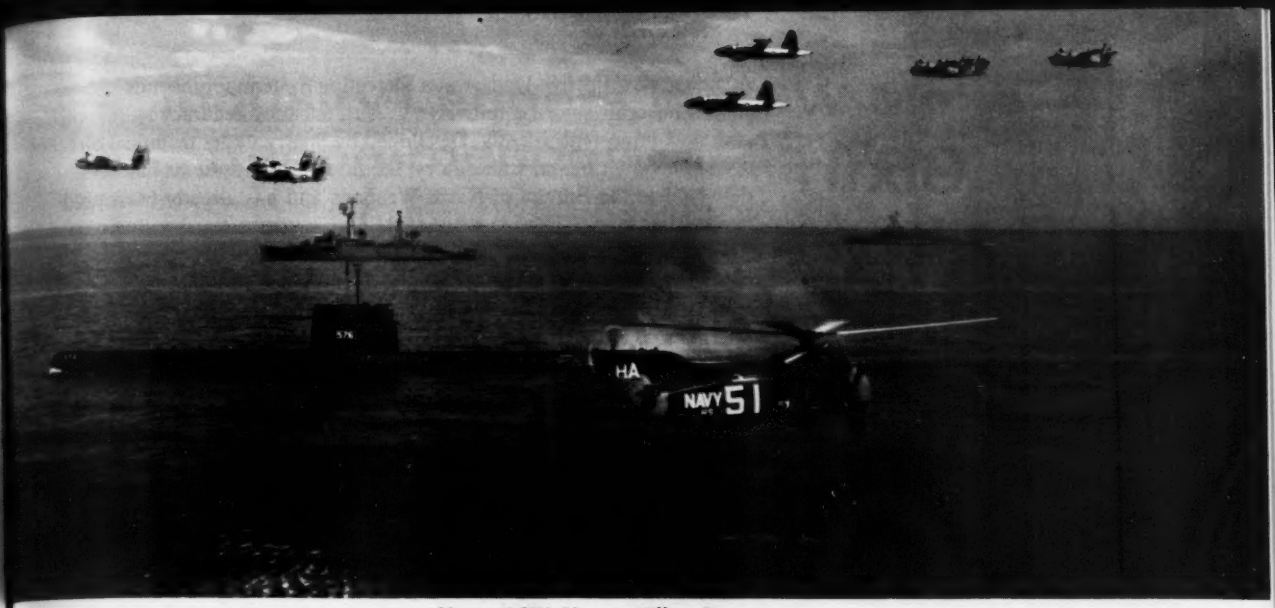
Now, the many officers and sections enumerated in the foregoing discussion may well be *necessary* to cover the many angles of the ASW problem. The men mentioned are all capable and qualified for their jobs. But they are scattered organization-wise and are geographically in various buildings and wings. *We have no central office that knows all the answers.* The recommendation of the National Security Industrial Association ASW Committee that a central ASW Information Center be set up is an eminently sensible and valuable idea.

The ASW organization, such as it is, needs a great deal more coordination and concentration, to approach it's information problem vigorously and effectively. CHINFO, the Navy Chief of Information Office of which I was once a part, currently has no ASW people on their query desks. In fact, the officer who was assigned to coordinate our efforts in this issue, to help us prepare the material in our glossary, etc., and who normally handles all newspaper ASW queries, told me that he never had any experience with the ASW field, never set foot aboard a destroyer nor is he an aviator. Needless to say, there was a great deal of frustration in the preparation of this issue, and the result was that very little of the material which we tried to work out with CHINFO was usable. A typical example was our attempt to get a definition of the term "Foxer Gear" for our ASW glossary. The answer from CHINFO? *Classified!* Foxer Gear, incidentally, merely means any of the type of deceptive devices used by a submarine to "out-fox" its pursuers! Also, as we go to press we are still waiting for CHINFO to return a question and answer interview with Admiral Hayward which was submitted for clearance to CHINFO sixteen days ago and is now ". . . up for coordination," whatever that means, last we heard. As we currently see the picture in CHINFO, there are too many people there who are following the famous old Navy rule: **If you don't understand it, oppose it.**

We feel the Navy is not pushing towards ASW solutions fast enough because of loose and uncoordinated arrangements for administration, public information, policy and decision making. Members of Congress have complained of this too: Admiral Rickover, when questioned about our ASW program by a House Committee, declared that we are in the same position of readiness against today's Soviet submarine threat that we were in 1940 as against the German U-boat threat. The rapid turnover of ASW key personnel is one reason. And no one needs to be reminded how close the Germans come to sweeping the U.S. off the Atlantic with their handful of submarines.

So let us have some positive action on putting the ASW program on a high priority basis with a very capable top man, *with authority in charge* for three years, an ASW information program, and all the present loose ends pulled together. It is up to the Navy to figure out the method of doing this and then taking action to accomplish it—*and soon.*

—MURRAY SMITH
Publisher, DATA Magazine



Navy ASW Hunter-Killer Forces

U. S. Navy HS-1 helicopter demonstrates dipping sonar detection method while S2F and P2V ASW aircraft fly over submarine USS DARTER (SS-576). Destroyers USS CALCETERA (DER-390) and USS HAZELWOOD (DD-531) are in background.

Mission
of the U. S. Navy ASW Forces

The U. S. Navy ASW Forces have the responsibility of denying the enemy effective use of his submarines.

Budget
ASW portion of Navy Budget

[NOA, in millions]

Navy appropriation	Fiscal year 1959	Fiscal Year 1960	Fiscal Year 1961
Research, development, test, and evaluation	[1] $ 202.7	[2] $ 225.3	$ 180.5
Shipbuilding and conversion	1,012.6	485.7	762.3
Aircraft and related procurement	266.3	476.8	345.2
Procurement of ordnance and ammunition	54.1	50.2	55.2
Major electronics procurement	60.1	37.9	27.6
Total, all appropriations	1,595.8	1,275.9	1,370.8

[1] Includes $20,500,000 DOD emergency funds.

[2] Includes $45,000,000 Congress add-on.

Sixth (and silent) Sense for Subs

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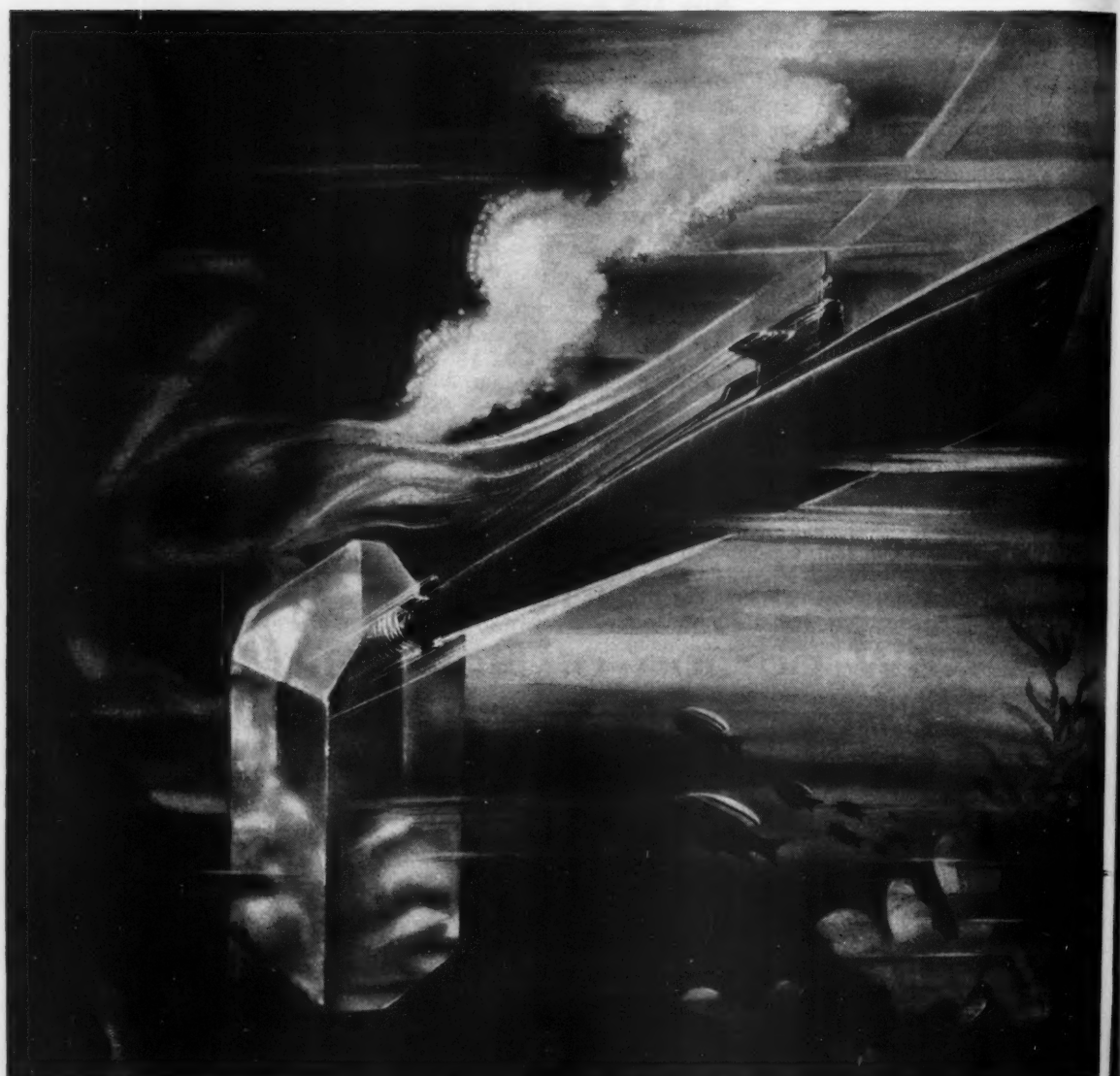
A radical new Passive Underwater Detection System apprehends submarine craft almost intuitively . . . with uncanny accuracy . . . and most important, silently. Developed by Sperry under technical direction of the Naval Ordnance Laboratory, the first of these systems has been delivered to the Bureau of Naval Weapons and has already been used in sea trials termed "highly successful."

Integral in the new system, most accurate and widest-range passive equipment known, is a high speed digital computer and data-processing section. This accepts, operates on, stores and displays instantaneous data relating to the target under consideration. This data is fed automatically into the detection craft's fire control center, and is compatible with present and foreseen target data systems. The computer incorporates both static and dynamic memory, as well as advanced technologies in time measurement, data cross-correlation, digital smoothing, servos, time compression circuitry using quartz delay lines, and accurate time-based generation.

This new system is one of a number of advanced ASW programs in production at Sperry's Surface Armament Division.



SURFACE ARMAMENT DIVISION, *SPERRY GYROSCOPE COMPANY · DIVISION OF SPERRY RAND CORPORATION, GREAT NECK, N.Y.*

Industry Leaders in ASW Make Recommendations to Navy

THE National Security Industrial Association (NSIA), an important trade group of industry leaders engaged in defense contracting, has an anti-submarine warfare advisory committee. The NSIA ASW committee central planning group met in Rochester, N. Y. 13-15 June to discuss its recently completed report and its resultant recommendations with Navy ASW leaders.

In its general recommendations to the Navy the committee proposes that:

1. **Industry "acquire and operate its own target submarines."**
2. **Navy torpedoes be pre-packaged for immediate use without further testing in the fleet.**
3. **Provision be made for new special-purpose manned, mobile, sonar underwater vehicles.**
4. **The Navy establish an anti-submarine information center to eliminate much repetitious work in the Navy and industry.**

TEST RANGES AND OCEANOGRAPHY INFORMATION NEEDED

The committee also asked for longer, deeper underwater test ranges for evaluation of torpedoes and missiles and cited what it termed "a crying need for more information" on many aspects of oceanography.

The detailed report is in three volumes, of which two were unclassified. It is the first report in writing from the Anti-Submarine Warfare (ASW) Advisory Committee's 24 groups and sub-groups.

OTHER RECOMMENDATIONS

Other recommendations called for greater flexibility in research and development contracts let by the Navy so the technical direction of a program can be changed, if necessary, as it progresses; encouraged service and maintenance contracts with industry to achieve optimum performance of equipment; and strongly advised that more contracts be written for feasibility studies to explore practibility of projects and for preliminary experimentation before specifications are written.

SPECIFIC RECOMMENDATIONS DETAILED

Beside comments on organization, the report listed these specific recommendations:

1. Underwater test ranges for evaluation of torpedoes and other ASW missiles to keep pace with submarine development. The committee endorsed establishment of longer, deeper range facilities.

2. Special-purpose underwater detection vehicles, equipped with data processing and communication equipment. The committee recognized these as best for ASW work, even though submarines can be used in this capacity. Without giving details, the committee identified the units and recommended consideration of a program to provide adequate numbers of the special-purpose, mobile, manned, sonar, underwater vehicles.

3. Oceanographic research, especially in such subjects as ocean depth contours, currents, tides and wave motion, temperature versus depth for various depths and locations, salinity vs. depth and location, and anomalies in gravity and magnetic forces in the ocean.

4. Mobile search platforms, placing major emphasis on the ability to survey rapidly an area of ocean to determine positively the presence or absence of submarines.

5. Increased acceptance by the Navy of the fixed ammunition concept. The committee explained it feels that planners of Navy equipment must design out complex testing and maintenance because the ever-increasing complexity of modern weapons places an insupportable burden upon Navy training and technical maintenance ability. Citing the modern acoustic-homing torpedo, the committee stated there is no present technical reason why the Navy should continue to burden itself with shipboard overhaul and maintenance of torpedoes. New design should provide a completely sealed torpedo with no need or possibility of test or adjustment.

6. Establishment of an ASW information center as a centralized source taking advantage of recent advances in library science and data access technique, to eliminate much repetitious work within the Navy and industry.

7. Continuation of industry personnel's attendance at the ASW Tactical School, Norfolk, Va., and witnessing of actual ASW tactical operations at sea was strongly recommended.

8. Endorsement of present fleet assistance in contractor testing of ideas and equipment. The committee referred to the importance of obtaining quantitative data for development from live submarine targets under service environment and expressed a hope that the Navy will look favorably on the industry's acquiring and operating its own target submarines.

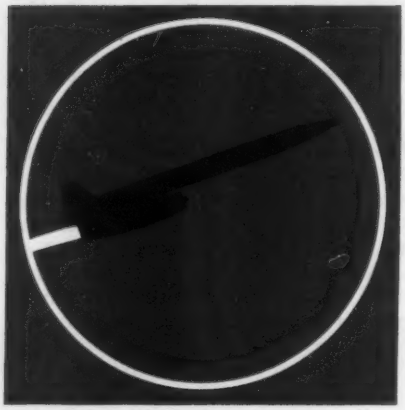
9. Endorsement of the Navy's use of study groups and symposia such as those that have helped with recent classified projects.

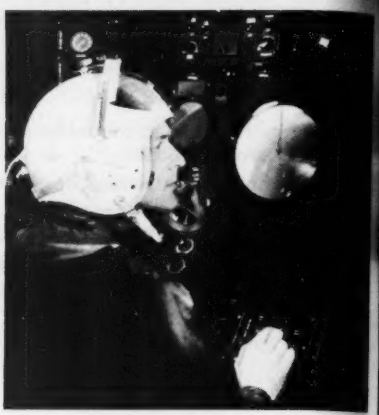
10. Fleet exercises to be with the proper type and number of vessels adequately supplied with the most modern types of equipment. The committee recommended that the duration of service assignment for Navy personnel be increased to permit maintenance of "professional" ASW teams with a high degree of operational efficiency in both fleet and research units.

SUM-UP

The committee cautioned against expecting a major technological breakthrough in the ASW field in the near future. It suggested that "step-by-step improvement in present techniques and equipment will result in more real gain than can be realized from operating with inferior equipment while waiting for the 'perfect' system to materialize." ■

The elements of guidance and control





Data Acquisition and Application Subsystems—IBM has proven capabilities to provide real-time man-to-machine and machine-to-machine elements of weapon guidance systems. In addition to the Bombing-Navigation system with its visual displays in the B-52, IBM also provides interface devices to apply this system to air-launched missile guidance. Federal Systems Division experience in air-based and ground-based guidance systems is proven in operation.

Data Communications Subsystems—The SAGE data processing system, heart of America's air defense network, embodies advanced communications devices and techniques required to filter and direct an enormous flow of data. Designed and built by the Federal Systems Division, the AN/FSQ-7, an advanced system in operation, embodies processing and communications power to direct defense operations as well as to guide missiles from remote sites.

Data Processing and Control Subsystems—Now in development, the Advanced Bombing-Navigation and Missile Guidance system is another example of IBM's "closed-loop" system capability. This system satisfies the operating requirements of high-speed, long-range weapon systems. Compact, reliable equipment such as this and Federal Systems Division's computer for the Titan missile guidance system are the result of IBM's vast background in data processing and control.

all systems capabilities of IBM

IBM's experience in data processing and data communications, supplemented by an extensive background in data acquisition, adds up to a three-way capability for developing, producing and integrating total automated systems. This capability is being advanced through continuing research in miniature high-speed devices for high-reliability guidance systems of the future.

Federal Systems Division, 326 East Montgomery Avenue, Rockville, Maryland IBM

MAGNETIC DETECTORS FOR ASW

by George Klass GRUMMAN

GRUMMAN S2F-1 TRACKER WITH MAD GEAR EXTENDED

The magnetic (anomaly) detector commonly called MAD has been in U. S. Naval service since World War II. It is the saturable core magnetometer type which can measure relatively small changes in the earth's magnetic field such as that caused by a submarine. The effective range of detection of the MAD equipment is inversely proportional to the cube of the distance. This means a short detection range. However, the MAD equipment has some excellent qualities. These are:

(a) Positive Classification Capability.
(b) Not Vulnerable to Electronic Countermeasures (ECM).
(c) Ability to pinpoint location of submerged submarine.
(d) Detection process is completely passive and does not alert the submarine to the fact that it has been detected.
(e) Has a fairly good short range search ability.

Grumman recognized that the Navy developed MAD gear was capable of improved performance and range if the aircraft and installation designers worked on it. This effort has been actively pursued since the first MAD installation was made in Model AF-3S aircraft in 1953. Over 800 MAD aircraft installations have been delivered to the Navy by Grumman.

The carrier-based aircraft design of MAD installations requires a retractable boom structure to extend the magnetometer detector from the magnetic influence of the aircraft. Six distinct designs of MAD booms have been made and tested. These include 4 rigid types which extended the detector 9, 12 and 16 feet aft of the aircraft, a 43 foot long semi-rigid structure which was inflated by air-pressure when extended and rolled on a reel when retracted, and a 24½ foot, 2 piece telescoping aluminum retractable boom. The most recent boom is a 16 foot rigid unit made from aluminum honeycomb material to achieve maximum stiffness at a minimum weight. All six booms were successfully tested and each contributed substantial information to improve MAD performance.

New methods of instrumentations were developed to correlate aircraft effects with MAD signals. Also new types of compensators were designed and tested which permit the aircraft to operate at different geomagnetic locations without loss of compensation adjustment. A special test fixture allowed simulated operation of the magnetic model at all dip angles from the polar to equatorial regions.

Grumman's MAD test and development work has resulted in a substantially improved aircraft MAD performance. The S2F-2 installation soon planned for fleet service will be easier to maintain, adjust and operate.

MAD work does not stop as there is still considerable room for improvement of future MAD installations. Active MAD projects include:

(a) Improved maintainability by repackaging equipment.
(b) Improved compensator devices to achieve still lower noise levels and more freedom of aircraft flight.
(c) Reduced equipment weight and more efficient utilization of aircraft space.
(d) Improved magnetic stability of aircraft.
(e) Improved boom designs.
(f) Towed vehicle for MAD equipment.
(g) Rubidium Vapor Magnetometer.
(h) Electron Beam Magnetometer.
(i) Proton Resonance Magnetometer.
(j) Signal Processing of MAD Information.
(k) Operational and Maintenance Trainers.
(l) Magnetic Materials Study.

MAD detectors for years have been associated with aircraft, but recently the hydrofoil boat has presented us with a new vehicle for this important detection equipment. *The same techniques of aircraft installation practice could be applied for the hydrofoil installation* although the proton resonance magnetometer appears to be a better type for the purpose. A MAD system would certainly augment the sonar information with a means of positive classification.

MAD is more important today for submarine detection than it has ever been. The modern submarine and its equipment present an increasingly difficult problem for the ASW effort. Because of MAD's invulnerability to jamming and countermeasures it may, in this writer's opinion, become the only effective detection equipment. ■

You Are Invited

to join the growing number of scientists, engineers and naval officers associated with anti-submarine warfare programs who are discovering CIC's unique research, design and production facilities in the fields of electro-acoustics, electronics, and underwater sound, and the merits, capabilities and applications of CIC products to the solution of ASW problems.

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REAR ADMIRAL GALLERY

Rear Admiral Gallery has had much experience in ASW. He commanded destroyers in anti-sub actions in World War II. Later he Commanded the Surface Anti-Sub Dvlpmt Group, Key West. At present he works with Washington Associates, as a consultant to several leading contractors in the ASW field.

ASW DETECTION

by Rear Admiral Philip D. Gallery (USN Ret.)

INFORMATION that the USSR has a fleet of 450 submarines, that the Russians have inaugurated an all-out effort in oceanography and rumors that they have a missile firing submarine all add up to a serious threat to our national security. *We have, as of today, inadequate means for stopping this threat—our anti-submarine warfare capability is falling behind the progress of the submarine itself.*

Recent Congressional approval of increase in the funds for ASW still does not answer the problem. We need a concentrated and enthusiastic organized program with plenty of scientific and interested backing to "close the ASW gap." We need new ideas and methods of piercing the underwater curtain that makes the submarine so effective.

The sole advantage the submarine has today, aside from nuclear powered submerged endurance, is *the ability to hide*. Take this cloak of secrecy away and the submarine is just another surface ship. Taking that away, however, is easier said than done.

Many experts believe that it is only in the past few years that the menace of the sub has been brought home and that is the reason we have lagged in developing countermeasures. It is time we treated the problem like a Manhattan Project or adapt some of the features of Admiral Raborn's highly successful POLARIS program.

The only practicable method of detecting submarines today is SONAR—echo ranging through the water to find and pinpoint the sub. Although great increases in the range of detection are reported we still do not have a satisfactory capability of detecting the enemy subs at safe ranges. By "safe ranges" we mean beyond the range at which the sub can harm us.

Other detection methods are: by "sniffer" gear (detecting exhaust fumes from the submarine by airborne devices); infra-red methods, airborne for detecting wakes; and various classified methods the Navy has under study and development.

PROJECT ARTEMIS is one of the foregoing that has been mentioned publicly and described as "an ocean surveillance system for anti-submarine warfare."

Magnetic Anomaly Detection uses an airborne device, that enables planes passing over a submerged submarine to detect the sub due to distortion of the earth's magnetic field by the submarine. Its short range makes it *valuable only in locating—it has little value in search*. Use of *sonobuoys* and explosive echo-ranging devices show promise but do not appear to be the answer to the search problem, as of now.

The development of the hydrofoil craft is of interest to ASW people. Admiral R. K. James, Chief of the Bureau of Ships declared to the Special House Investigating Subcommittee on Science and Aeronautics:

> "This 110 ton hydrofoil craft, called the PC(H) shows tremendous promise for anti-submarine warfare where we need speed as never before.
> Ideally, two PC(H)s will operate together, in a grasshopper or leapfrog technique. First one will move slowly through the water in a displacement condition, listening for submarines with long-range and variable depth sonars. The other will fly ahead, then settle into the water and listen while its partner flies in turn. When a listener gets a submarine on its sonar, it will signal its partner PC(H) and guide it to the target. The partner will be moving at top speed by then. The submarine might be very fast, but before it gets very far the flying PC(H) will track it down and drop a homing torpedo for the kill."

This ingenious idea of using hydrofoil craft in ASW is an example of the creative and original thinking needed in attacking the submarine threat. Parenthetically in commenting on this "leap frog" idea, however, we must point out that this PC(H) still needs a variable depth sonar of much greater range than is presently available for the small sonar needed in a PC(H).

The problems of classification, (determining whether or not you have a submarine, a whale, school of fishes, pinnacle, etc.) is still serious but must rank after the detection problem in importance. Localization and destruction likewise are steps that come *after* detection. They are being investigated and some progress is being made.

Variable depth sonar is being developed for surface ships and helicopters—the advantage of getting below the "thermal layer" is important. This layer can render even the latest SQS4 or later sonars ineffective. It is another problem to be solved, although the bottom-bounce technique may be an important step in this direction.

Overall, the problem of defeating the submarine is far from solved and needs new approaches, concerted effort and scientific assistance to figure out ways and means of taking away from the submarine its only real reason for existence—the ability to HIDE. ■

ASW Platform Status

PLATFORM	ASW EQUIPMENT	ATTACK WEAPONS	DISADVANTAGE	PLANNED REPLACEMENTS	EXPECTED IMPROVEMENTS IN NEW TYPES
P2V, Land based, air	Radar, MAD, ECM, Sniffer gear, Sonobuoys	Homing torpedo, Rockets, depth charge, nuclear bomb	Fixed large base requirements and cost	P3V, replacements	Modernization, speed and general standard equipment performance
P5M, Seaplane, water based, air	Radar, MAD, ECM, Sniffer gear, Sonobuoys	Homing torpedo, rockets, depth charge, nuclear bomb	Inconvenience for basing and cost	None	
S2F-1, Carrier based, air	Radar, MAD, ECM, Sonobuoys	Homing torpedo, rockets, depth charge, nuclear bomb	None for type design	S2F-3	Modernization, equipment performance
Blimp, land based, air	Radar, MAD, ECM, Sonobuoys	Homing torpedo, depth charge	Special type basing and weather limited	None	
Helicopter, Carrier based, air	Sonar; passive-active, MAD	Homing torpedo, depth charge	Short range and limited weather operation	HSS-2	Amphibous, all weather capability and twin engine safety
Destroyer, port or mobile based, surface	Radar, Sonar; passive-active, ECM	Homing torpedo, rocket, conventional depth charge	Short range and low detection probability at high speed, limited performance in high sea state	Modern design	DASH, Helo and rocket fired homing weapon concept
Conventional submarine, port or mobile based, subsurface	Radar, Sonar; passive-active, ECM	Homing torpedo, missile	Low speed	Nuclear power	Range speed and homing weapons
Nuclear submarine, mobile based, subsurface	Radar, Sonar; passive-active, ECM	Homing torpedo, missile	Cost	Improved design	

THE TREND IN ASW PLATFORMS

P2V-5F, now in service . . .

. . . being replaced by P3V

S2F-3 TRACKER will stay on

LAND BASED PATROL AIRCRAFT

New airborne platforms are being needed to replace fleet units after normal wear and tear. The old land based work horse, the Lockheed P2V will be phased out over the coming years and replaced by the military version of the Lockheed ELECTRA, the P3V-1. The significant advantage in the ASW ELECTRA is not so much in increased ASW performance, but a chance to re-configure a multitude of recent R&D equipment in a new airframe. The old P2V and subsequent modifications up through the P2V-5 are overloaded with so called "black boxes."

Lockheed in a press release states that the new P3V-1 can search 280,000 square nautical miles of coastal area in a single flight. The release failed to give a probability figure for search rate in the area described.

The ASW ELECTRA is longer than the commercial version by apx nine feet. The additional length is in the tail cone, housing the magnetic airborne detection gear. Of major note in the replacement platform is the significant increase in visual lookout area. The normal airline windows have been replaced by large observer windows located fore and aft. This is, no doubt, to take advantage of the visual factor trend in ASW.

Lockheed states that missions can be flown at 25,000 feet with a cabin pressure of only 8,000 feet. This is slightly higher than its unpressurized predecessor, the P2V.

Of the gross weight, two and one half tons are composed of the latest electronic navigation and submarine detection equipment, most of which is already installed or has been tested in the P2V. Other improved performance factors are range, speed, and resultant time on ocean station, one thousand miles away

HSS-1, dipping sonar, will phase out . . .

. . . in favor of HSS-2

WF-2, above, has replaced AD-5

plus eight hours of patrol. Armament is believed about the same as the P2V. Rockets, homing torpedoes, depth charges, and nuclear bombs.

In the final analysis, the P3V-1 is a new and necessary replacement with higher performance without significant improvement in basic ASW detection capability, beyond refinement.

CARRIER BASED AIRCRAFT

Grumman is not so lucky as Lockheed to have a civilian R&D product that can be converted to an ASW platform. The direct result is cost. The S2F dash one and dash two Sub-killers are specially designed and sturdy ASW vehicles to operate from an aircraft carrier; a procedure which to date has no civilian counterpart.

The primary difference between the dash one model and the dash two is range and nuclear armament capability. However, with the improvement in atomic weapons and with modifications for additional fuel stowage in the S2F-1, only a limited number of the second model are needed.

The S2F-1 had to be replaced eventually. The answer was the S2F-3, A modified version of the original model. Outwardly, the new airplane looks identical to the dash one except for increased length. Actually, the dash three is refined in ASW capability from the standpoint of aircraft performance. Since the first model came off the production line, new equipments and concepts have come into being.

THE HELICOPTER

A method of giving the aircraft an active acoustic part in ASW is the helicopter-sonar concept. Past platforms have been the Pieseki HRP (the Flying Banana used in the initial helicopter sonar evaluation), the Sikorsky HO4S (later replaced by the HRS with a larger power plant), the Pieseki HUP, and now in ASW operation the Sikorsky HSS-1. The HSS-1N is presently being delivered to the fleet. The major emphasis is in aircraft performance rather than pure detection capability. New improvements in the HSS-1N are new radars to measure ground speed and altitude more accurately, improved cockpit and instrument arrangement, automatic engine revolution control, and an automatic "hover coupler."

Most of the improvements in the HSS-1N will no doubt be incorporated in the revolutionary new amphibious model, the HSS-2, now undergoing flight test. To remove the normal objection to single engine helicopters operating over the ocean, the twin engine HSS-2 recently demonstrated single engine performance by securing one engine and flying back to base. The boat hull, as well as the single engine performance should remove the anxiety problem of a possible engine failure. No heavy sea landing and operational data has been released. Also not released as yet is the new load carrying and "kill" weapon capacity. The present helicopter carries only the 200 pound MK-43 homing torpedo.

The analysis leans to an improved platform, capable of carrying more refined active sonar detection equipment which will determine its place in ASW.

THE SEAPLANE

Failures in the $800,000,000 P6M project as well as in the DART program probably had their effect in reducing emphasis on the seaplane as an ASW platform. Martin Corporation in Baltimore is presently working on the P5M-2 to improve performance in range and capability. However, no contracts are on file for newer types and designs of the seaplane as an ASW vehicle. With the mothballing of their mobile bases, the seaplane tenders, ASW seaplanes appear to be on the way out.

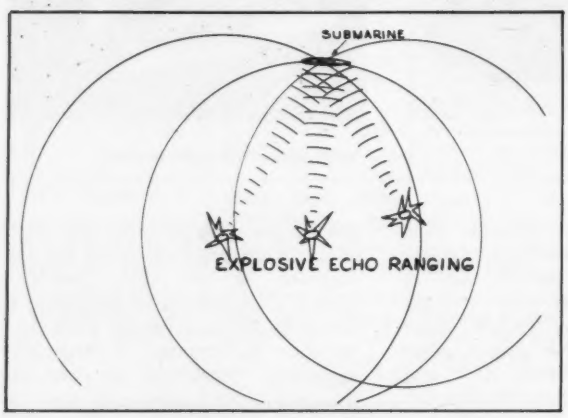
SHIP AND SUBMARINE

In the surface and sub-surface platform picture, the trend is to nuclear power for improved performance. The destroyer of the Frigate class (destroyer leader) is scheduled for atomic power. This will overcome the speed/range limitation but will do little to improve the rough sea disadvantage in basic detection. Nuclear power in the submarine is the most advantageous. It permits the submarine to cruise fast in the very deep where detection is hard if not impossible. Forty-three nuclear powered submarines are scheduled for fleet operational use by 1963.

RADAR & COMMUNICATION RELAY

The radar version of the single engine Douglas attack plane, the AD-5W, is being replaced by the Grumman WF-2. This vehicle with the radar antenna housed above the wing gives an odd appearance to the new carrier platform—an outgrowth of S2F design. Although the WF-2 is not directly an ASW platform, the airframe is vital in long range radar and ECM surveillance equipment, having automatic communication links to floating bases. ■

Recent Developments in ASW Weaponry



PROJECT "JULIE" OR EXPLOSIVE ECHO RANGING

This sub seeking method was developed from the principle that underwater explosions produce impulse waves that travel very long distances at high speeds. An underwater explosive rescue device for downed aviators, called SOFAR—sound orientation for aviator rescue—led to the explosive echo ranging submarine location method.

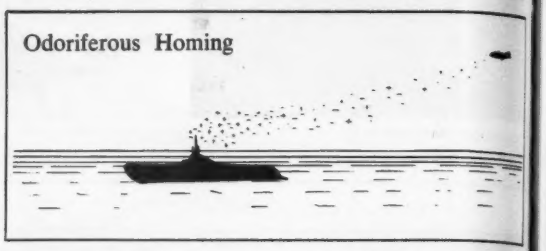
In "Julie" or the explosive echo ranging (EER) method of submarine hunting, the search ship or aircraft drops a radio buoy containing an underwater demolition charge of special design which explodes at a predetermined depth. Echos from a hidden submarine return to the buoy and knowing the speed of the sound wave, the length of time it takes for the echo to return establishes the radius distance away from the buoy that the hidden submarine is located. The first echo return position gives an initial circle, with the transmitting buoy as the circle center. Somewhere on this circle is the hidden submarine at time of first echo intercept. Subsequent echo ranging from other EER-buoys form other locator circles which intersect to form a pin-point showing the exact location of the submarine at time of echo intercept.

The Navy has high hopes for the explosive echo ranging method of submarine search. Most valuable asset of the method is its phenomenal range wherein submarines can be located at distances of several hundred miles. The ranges, therefore, of EER are much in excessive of any SONAR device.

SNIFFER GEAR

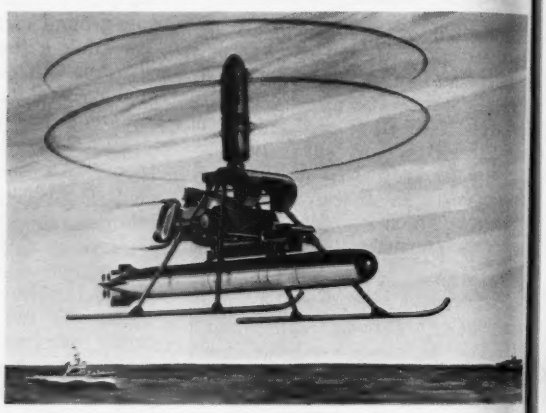
Odoriferous Homing, known as "Sniffer Gear" in the fleet, uses the contamination of the atmosphere above and downwind of a snorkeling submarine as a homing stimuli.

Air is ionized by the exhaust gases emitted from the



sub, and sensitive electronic equipment in the aircraft picks up the scent from many miles away.

Approaching the hidden submarine from downwind, the hunter-killer aircraft follows the chemical disturbance in the air to its more intense location. When in the vicinity of the sub as determined by the Sniffer Gear, the aircraft may use any one or a combination of several other conventional means of sub detection such as searchlight, sonobuoys, or magnetic anomaly detection (MAD) to pinpoint the target.



DASH

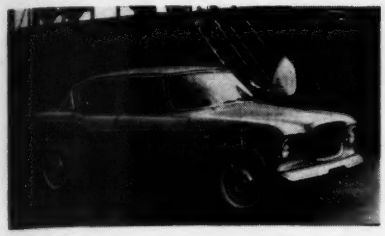
The Navy's DASH (Destroyer Anti-Submarine Helicopter) is perhaps the most immediately useful development in ASW. The Navy has been waiting a long time for a robot helicopter that is both recoverable and effective against submarines.

The DSN-1 is already operational on one or more modified destroyers. The necessary modifications include a small above the deck hangar, and scaled down flight deck. This is economically accomplished, as both are built as an above-deck unit, the hangar being on one end of the flight deck. It is believed that eventually as many as 200 Navy vessels will undergo these modifications.

Although DSN-1 is just barely operational, DSN-2 and DSN-3 are already rolling off the assembly line. These more advanced models are still highly classified, but those who are in-the-know are highly enthusiastic about their capabilities.

COMPARE THE REPAIR BILLS...

LARK vs. OTHER COMPACTS!



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	LARK 6 DELUXE (Frame & Body Construction)			TYPICAL SMALL COMPACT (Unitized)			TYPICAL 6-PASS. COMPACT (Unitized)		
	PARTS	LABOR	TOTAL	PARTS	LABOR	TOTAL	PARTS	LABOR	TOTAL
REAR CORNER COLLISION, *Right Rear*	$89.55	$62.50	$152.05	$96.15	$75.00	$171.15	$122.85	$69.00	$191.85
	SAVE AS MUCH AS $39								
STRAIGHT REAR END COLLISION	$192.50	$74.00	$266.50	$207.10	$200.00	$407.10	$239.15	$120.00	$359.15
	SAVE AS MUCH AS $140								
FRONT CORNER COLLISION, *Right Front*	$143.80	$50.50	$194.30	$205.60	$115.50	$321.10	$259.80	$100.50	$360.30
	SAVE AS MUCH AS $166								
STRAIGHT FRONT END COLLISION	$255.85	$83.00	$338.85	$358.95	$211.00	$569.95	$453.45	$181.50	$634.95
	SAVE AS MUCH AS $296								

(All necessary parts included. Labor figured at $5 per hour.)

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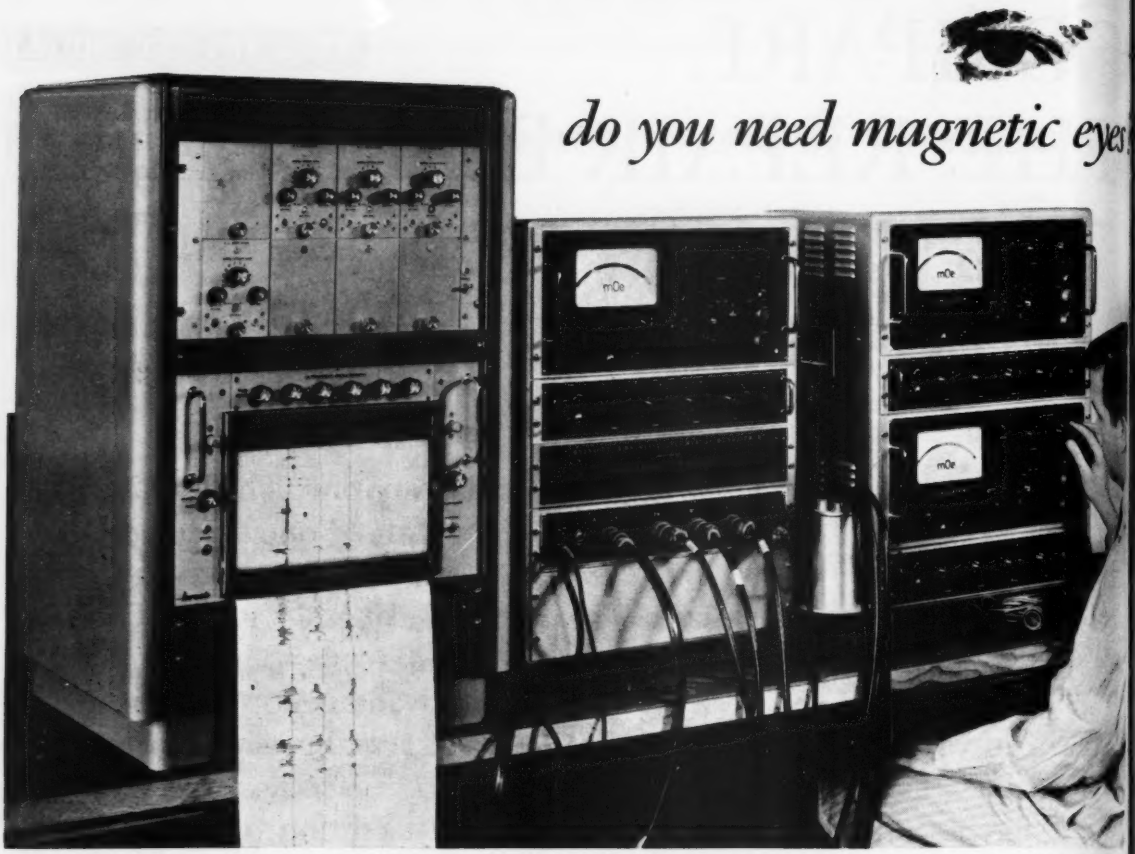

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"TO MANAGE a business well is to manage its future; and to manage the future is to manage information."

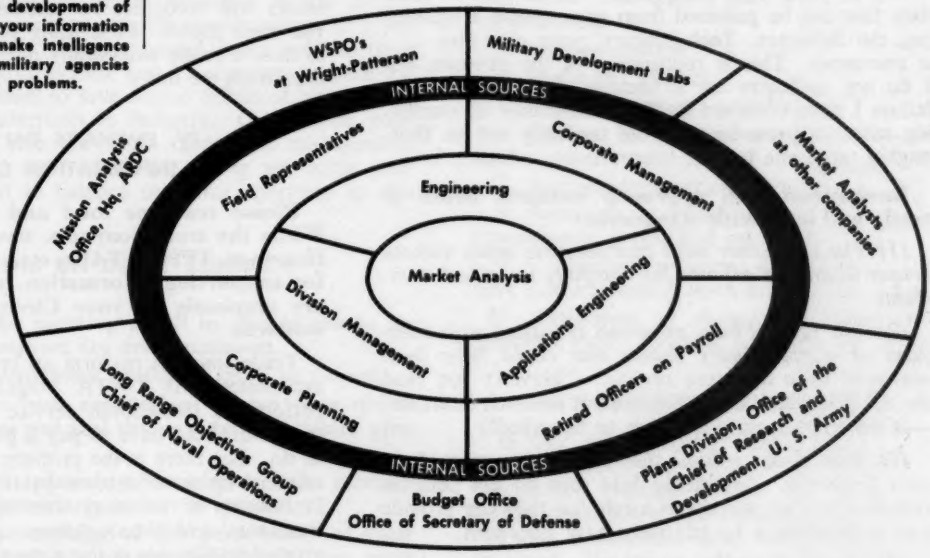
—Marion Harper Junior, President and Chairman of the Board, McCann-Erickson, Inc.

Market Intelligence . . . what to look for . . . where to find it . . . how to obtain it

by Patrick Thomas for DATA

CIRCLE OF INFLUENCE

Your success in developing an effective instrument in the formulation of policy (as opposed to mere fact finding) will be proportionate to the progressive development of your circle of influence . . . your information sources who expect you to make intelligence a two way street and the military agencies which want answers to their problems.



THE SUBJECT for this month cannot, of course, could not be covered in a few pages, nor did I wish to present to you material of the usual garden variety, e.g. basic source lists, etc. A recent interview with the marketing director of a $300 million-plus-per-year defense contractor gave me cause to summarize my thoughts apropro the subject of market intelligence and these, then, are the framework of this article.

His concern was not the need for intelligence sources but the ways in which to develop a *modus operandi* which would provide timely, accurate and pertinent information that could render a positive assist on managing the future of the company.

In our business the basic products are technical competence and management capability. To thrive in such an environment the market research function must have at its fingertips ready access to the acquisition of intelligence which will allow it to operate in an environment that

(a) demands specifics

(b) generates demands with short reaction times

(c) requires clear-cut analyses, devoid of hedging, e.g., do we or don't we bid?

First let me summarize my remarks for this marketing director, then expand upon each item for clarification:

I. Build and operate the market research function upon the circle of influence concept.

II. Exhaust internal sources before packing your bags.

III. Make RECIPROCITY a policy — the best intelligence is obtained only on the development of systematic, mutual interchange—as in law, due consideration must pass.

IV. Place more emphasis on primary information sources (direct contacts) then literature (secondary source material).

V. Provide balance in the type of direct contact sources.

VI. Observe protocol and make it work for you.

I. CIRCLE OF INFLUENCE

Circle of Influence has been practiced by successful businessmen for ages and scarcely needs detailing. At one time or another you have all tossed stones into a lake and observed the rapid development of the widening concentric circles emanating from your application of energy. It has helped me to think of the market intelligence function in a similar manner.

Management tosses you a problem (or better still, you *anticipated* your superiors) and this causes an expenditure of energy on your part. You should then proceed through a logical sequence of actions, drawing on widening, further afield but inter-related sources.

II. EXHAUSTING INTERNAL SOURCES

Dig in your own backyard. The amount of good data that can be gathered from trip reports, Engineering, the Salesmen, Tech Library, your own files . . . is enormous. This is recognition of the obvious, but I do not apologize for it because the most common failure I have observed in the performance of marketing research procedures is the tendency not to thoroughly tap home bases.

In contrast, the approach outlined below is costly and inherently dangerous:

(1) The researcher steps into sensitive areas without proper fill-in and exposes his company to critical comment.

(2) The time of busy personnel is wasted with questions of a preliminary nature that could have been answered by a literature review. ("Haven't you read the ARPDs which cover this area of research interest?" —is an embarrassing question to be asked!)

(3) You cover ground that should be covered by your field reps. Admittedly field reps do not perform complete market surveys as a rule but they can provide you with answers to relatively easy questions.

(4) Travel is costly so trips are not taken. As a missionary for market research I hate to see embryonic functions reduced to clipping services by hard headed, cost conscious managements that are "burned up" over travel far more costly than its worth. One leading airframe manufacturer completely stopped his market research functions for over two years for reasons directly stemming from this cause. If a trip is helpful, it should be taken.

III. MAKE RECIPROCITY A POLICY

Intelligence is a two way street because your sources are as dependent on you as you are on them.

I have always followed the policy of having something in hand to offer when making direct contacts. Particularly on highly technical visits is it necessary to have the capability to "give and take" down to the short strokes. *I think it's poor practice to send a non technical analyst into a top technical office with a questionnaire expecting the respondent to cooperate fully because "it will allow us to make you a better product."* It costs something to take one of your senior engineers along to build rapport, but my experience is that this approach produces highly gratifying results. And—let's face it—it's a marvelous form of indirect selling.

Another useful practice is to forward non proprietary information to your sources that you know or suspect is of interest to them. Particularly is this appreciated within Engineering. And it is a most important function of the market research group—one that builds friendships and demonstrates your usefulness. It's so easy to clip and file without routing copies to your good friends within the organization. Just a little more effort in this regard will reap rewards in the form of cooperation far in excess of costs.

For example, *do you publish a Competition Intelligence Log on a periodic basis?* You should, you know, particularly for your prime areas of interest. When you start one you'll notice that Engineering, salesmen and others will recognize its usefulness and start sending you their inputs. First thing you know, you're going to have a really worthwhile document. Yes, one hand does wash the other.

IV. EMPHASIS ON PRIMARY INFORMATION CHOICES

Please read me loud and clear on this item: While the trade journals, newspapers, Committee Hearings, TPPDs, TAPs, etc., are excellent sources for supporting information, you must place primary emphasis on your Circle of Influence direct contacts.

Trade journals perform an invaluable function. My experience with DATA Magazine has been that it performs a tremendous service for a dollar a month that you would have to pay a good analyst a top wage to do. But there is the problem of the "security veil," editorial opinions in some publications, the inescapable limitations of accuracy due to half-truth reporting, timeliness and thoroughness. *And, you receive this printed intelligence at the same time as countless others.*

Even the classified planning documents suffer from the problem of timeliness. Plans change rapidly and technical progress is made on an incremental, daily basis.

So, while I have stressed the utilization of internal sources before field trips are made, I wish to be quick to point out that it is necessary for market research to personally take the pulse beat and that primary emphasis must be placed upon first hand contacts. No doctor would dare to practice medicine by osmosis.

V. BALANCE IN THE TYPE OF DIRECT CONTACTS MADE

Taking out the bias—this is the problem. The salesman is the perennial optimist . . . if he weren't he couldn't keep smiling. The engineers, I find, are remarkably good salesmen for their own pet projects. The components people at the field development centers are enthusiastic for the "better" way but the operations analysts point out that in today's tight money market a 10% increase in performance won't swing the change.

The answer to the problem is balancing your sample and getting all sides of the story. And this is where the fallacy of excessive reliance on field personnel comes in. Salesmen could care less about contacts in the Bureau of the Budget but this is a most important source to the analysts. I had a colonel in an ARDC advanced analysis section tell me recently that he wished more contractors appreciated the need for cross fertilization. Unfortunately, sales personnel are not as well oriented to such offices as they should be in the systems business. (The usual routine being to call on Engineering with considerably less emphasis on Purchasing.)

VI. OBSERVE PROTOCOL AND MAKE IT WORK FOR YOU

Systems selling must observe protocol. It's the intelligent approach to intelligence, so to speak. My practice has been to utilize personnel in the proper tier of management, to go after specific pieces or types of information . . . to go through doors open to their level. Rank talks to rank and it's common practice for military personnel to save choice tidbits of information for their counterparts in industry. Use this to your advantage. There are some cards that management will hold close to its chest but you're not doing your job if you fail to balance out your operation in this manner.

HINTS ON DIRECT CONTACTS

Do

1. Keep the meeting small in size to create an easier environment for free comment.

2. Have something useful to offer in return.

3. Be sure your respondent knows your objectives and does not feel this is a type of "sales gimmick."

4. Study the planning documents of the services carefully, particularly before a contact.

5. Know something of the personality of your respondent and his responsibilities before your meeting.

6. Achieve balance in the type of sources utilized.

7. Remember that you have been granted valuable time—time that a consultant would charge you dearly for. A short note is a nice supplement to your verbal "thank you."

8. Develop your most fruitful contacts—you'll need them for fast answers. Be patient with your wary contacts.

9. Relax and enjoy your meeting.

10. Above all, be sincere. Level with your respondent.

Don't

1. Push to hard on the first contact.

2. Lead your respondent to an answer you'd like to hear.

3. Overwhelm your contact(s) by arriving en masse.

4. Formalize the session by chart talks.

5. Indulge in obvious or copious note taking.

6. Think your valid "need to know" guarantees you that your respondents will tell all—or are obliged to do so.

7. Monopolize the conversation. (Yes, I've seen it done many, many times.)

8. Forget to write-up the details of your meeting as soon as possible. (It's not a bad idea to have a tape recorder in your car or hotel room to take down details while still fresh in your mind.)

PROGRAM INTELLIGENCE REQUIREMENTS

The following ten points should be assessed in order to figure your relative potential in subject project:

1. Type and description of project

2. Prime contractors, team partners and functions, key personnel

3. Mission concept

4. Status and priority

5. Funding: existing, possible future

6. Timing by phases: unfunded studies, funded studies, development phasing

7. Key requirements and ground rules

8. Potentials as based upon projected development expenditures, production rates and force levels

9. Competitive programs (the success of which may have a direct bearing upon subject program)

10. Assessment of mainstream and influential key personnel (your boosters, antagonists and neutrals).

A COMPETITION SCREENING PROFILE

In any intelligence gathering regarding a specific defense project, you can't afford to forget about your competition. Assign relative weights to each of the factors listed below and develop a rating system which will give a statistical index value for each competitor analyzed. The values will vary by program considered and you may desire to add or delete certain of the factors below:

1. Competitive standing in field

2. Relationship with affected service arm

3. Intensity of marketing effort

4. Need for this award as based upon current and projected backlog of existing programs

5. Soundness of contractors technical approach

6. Cost of proposed system or subsystem

7. Lead time compatability with service arm's schedule

8. Labor surplus area considerations

9. Technical competence in critical areas

10. Ability to handle the program technically

11. Ability to handle the program production-wise

12. Status of financial resources

13. Geographical resources. ■

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CDR J. F. White (R)

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1018 LCDR D. D. Friedle

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2009 LT L. A. Hixson (R)

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1021 LTJG F. P. Jones

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212 ASST. FOR EVAL. COORDINATION
2101 CDR A. D. Lesch

213 PROGRESS ANALYSIS (5146)
2110 LTJG I. M. Mombrun (W)

22 O. E. G. REPRESENTATIVE (5177)
2108 Mr. D. D. Bouriand (Civ)

23 OPERATIONS (5062/5082)
2006

231 ASST. SURFACE & SUB-SURFACE OPERATIONS (5064/5065)
2105 CDR R. J. Young, Jr. (D)
LCDR S. R. Mc Cord (R)

232 ASST. FOR AIR OPERATIONS (5064/5085)
2106 CDR S. M. Cooley

233 AREAS & SCHEDULES (5064/5085)
2104 LT H. G. Manham

24 PLANS (5062/5082)
2002 CDR A. M. Brouner

25 COMM. & REGISTERED PUBS. CUSTODIAN (5064/5065)
2104 ENS R. F. CUMMINGS (R)

26 ONR LIAISON OFFICER (5187/5197)
2101 CDR C. L. Peterson

Pacific Project

(NAS, San Diego - Ph. HAmpstead 5-6611)

30/03 DEPUTY CHIEF OF STAFF FOR PACIFIC PROJECTS DIVISION (513/256)
CAPT H. C. Maynard
CAPT J. R. Penland, Jr. (R)

30A ADMINISTRATIVE ASSISTANT
LCDR G. Hanfman

30B O. E. G. REPRESENTATIVE
Mr. W. G. Leight (Civ)

31 ASST. FOR PACIFIC PROJECTS & PLANS & OPERATIONS
CDR E. M. Coppola

311 ASST. FOR PLANS
LCDR Q. R. Schulz (R)

312 ASST. FOR OPERATIONS

313 ASST. FOR AIR OPERATIONS
CDR W. E. Johnston (R)

313A COMMUNICATIONS
LT H. R. Crandall

32 SURFACE WARFARE TEST
LCDR N. Lemieux (R)

33 ANTISUBMARINE WARFARE TEST
LCDR R. W. Kreis

34 AIR WARFARE TEST
LCDR J. F. Lasseter (R)

341 ASST. AIR WARFARE TEST
LCDR W. M. Mohlenhoff (R)

35 COMBAT DIRECTION SYSTEM COORD.
CDR F. S. Knight

351 ASST. CDS COORDINATOR
CDR C. E. Swallow

353 COMPUTER - PROGRAMMER
LT H. L. Hall

353 COMBAT INFORMATION CENTER
CDR J. Morris

354 DATA GATHERER
LT J. W. F. Rousse (R)

355 DATA USER
LT A. T. Loughlin (R)

356 COMBAT DIRECTION SYSTEM MAINT. AND COMMUNICATIONS
LCDR F. D. Wilson (R)

36 SURFACE WARFARE EVALUATION
LCDR J. C. English

37 ANTISUBMARINE WARFARE EVAL.

38 AIR WARFARE EVALUATION
LCDR H. Allen III

381 ASST. AIR WARFARE EVAL.
LCDR H. K. Richards (R)

Surface & Mine Warfare

70 DIRECTOR SURFACE & MINE WARFARE DIVISION (5536)
1104 CAPT E. F. Schretter

71 HEAD SURFACE & MINE WARFARE TEST SECTION (5536/5537)
1110

711 ASST. FOR SURFACE WARFARE TEST (5536/5537)
1112 LCDR R. V. Biordi (R)

712 ASST. FOR MINE WARFARE TEST (5536/5537)
1112

713 ASST. FOR SHIPS MATERIAL TEST (5536/5537)
1113 LCDR E. R. Bristol (R)

72 HEAD SURFACE & MINE WARFARE EVALUATION SECTION (5536/5537)
1104A

721 ASST. FOR SURFACE WARFARE
1106 CDR F. K. Clymer

721A ASST. FOR SURFACE LAUNCHED MISSILES (5537/5538)
1104 LCDR H. B. Gibbs
LCDR S. H. Burg (R)

721B ASST. FOR SURFACE LAUNCHED MISSILES (5537/5538)
1105 LCDR J. G. Finneran

722 ASST. FOR FLEET BALLISTIC MISSILES (ReWeps)
LCDR R. A. Heenacker

722A ASST. FOR FLEET BALLISTIC MISSILES (ReWeps)
LT H. A. Cherrier

723 ASST FOR MINE WARFARE (5537/5538)
1104D CDR J. E. Boyle, Jr. (D)
CDR A. E. Cosby

723A ASST. FOR MINE COUNTERMEASURES (5537/5538)
1104B LT. P. Blundell

724 ASST. FOR SHIPS MATERIAL (5435/5537)
1104C

73 HEAD SURFACE & MINE WARFARE TACTICS & TRAINING SECTION (5535/5537)
1103

731 ASST. FOR TACTICS & TRAINING (5535/5537)
1103 LCDR P. F. Werner

Tactical Review

80 DIRECTOR TACTICAL REVIEW DIVISION (5041)
1001 CAPT G. E. Chalmers

81 AIR TACTICAL REVIEW (5048/5068)
1008 CDR S. R. Holm
CDR T. W. Rhodes (R)

82 SURFACE TACTICAL REVIEW (5048/5066)
1003 CDR J. M. Gunn

821 ASST. SURFACE TACTICAL REVIEW (5048/5066)
1008 CDR S. L. Sutton (D)
CDR J. H. Knoche

822 ASST. SURFACE TACTICAL REVIEW (5048/5068)
1003 LCDR S. B. Nichols

83 UNDERSEAS TACTICAL REVIEW (5048/5066)
1002 CDR J. W. Reed

831 ASST. UNDERSEAS TACTICAL REVIEW (5048/5068)
1002

Comptrolle

90 COMPTROLLER (50[illegible]
2007 CDR R. F. Neuman, Jr. (RC)

91 FORCE SUPPLY (50[illegible]
2007 LCDR F. L. Gilbert (RC)

(R) - Ordered to report
(D) - To be detached upon reporting of relief

Room number precedes name
Phone number follows billet title

MISCELLANEOUS PHONE NUMBERS

Barber Shop (Barracks CI-II)
Communications
CMAA (Barracks CA-III)
Dental Clinic
Dispensary
Duty Officer (PACPHIL, [illegible]
Flag Mess
Mail Room
Management Control Center
MONTEVDET
Personnel Office
Staff Duty Officer
Staff Illustration - Graphic Arts
Supply Storeroom
Transportation

FAU, CINCLANTFLT, [illegible]

EST AND EVALUATION FORCE
ANIZATION

1 JULY 1960

O
EVFOR
5020/5020

002
AIDE & FLAG SECRETARY
2000 LCDR E. C. Elliott 5337/5338

STAFF & AIDE
5031

ADMINISTRATION
PLANS, OPERATIONS AND PROJECT COORDINATION

Antisubmarine Warfare

40 DIRECTOR ANTISUBMARINE WARFARE DIVISION (5078)
1202 CAPT W. R. Glennon

41 HEAD ASW TEST SECTION (5076/5077)
1204

411 ASST. FOR AIR ASW TEST (5076/5077)
1204B LCDR E. A. Jacobs
LCDR F. H. Baughman (R)

412 ASST. FOR SURFACE ASW TEST (5076/5077)
1204A LCDR J. H. Ratliff (R)

413 ASST. FOR SUB-SURFACE ASW & TORPEDO TEST (5076/5077)
1204 LCDR H. B. Thomas, Jr. (D)
LCDR H. A. Taylor (R)

42 HEAD ASW EVALUATION SECTION (5078/5079)
1204C CDR H. B. Sanders, Jr.

421 ASST. FOR AIR ASW EVALUATION (5076/5077)
1208 CDR A. C. Cason

421A ASST. FOR AIR ASW EVALUATION (5076/5077)
1209 LCDR W. L. Spann

422 ASST. FOR SURFACE ASW EVALUATION (5078/5079)
1208 CDR G. B. Lovejoy

422A ASST. FOR SURFACE ASW EVALUATION
1209 LCDR N. A. Ricke

423 ASST. FOR SUB-SURFACE ASW & TORPEDO EVALUATION (5076/5077)
1204A CDR A. J. Miller

423A ASST. FOR TORPEDO EVALUATION (5078)
1208 LCDR M. Bisceglia (R)

43 HEAD ASW TACTICS & TRAINING (5076/5077)
1204 CDR D. B. La Pierre

431 ASST. ASW TACTICS AND TRAINING (5078/5079)
1214 LT R. C. Mc Caffree (R)

Air Warfare

50 DIRECTOR AIR WARFARE DIVISION (5087/5088)
1209A CAPT C. N. Comstock

51 AIR WARFARE TEST (5088/5089)
1211 CDR G. Forrest

511 ASST. AIR WARFARE TEST FOR ATTACK WEAPONS (5088/5089)
1211 LCDR H. L. Benson

52 SPECIAL WEAPONS & ASST. AIR WARFARE EVAL. ATTACK WEAPONS (5080/5089)
1213 CDR C. C. Sanders

521 AIR WARFARE EVALUATION (5080/5089)
1213 CDR B. C. Kay

521A ASST. SPECIAL WEAPONS FOR LIGHT ATTACK (5080/5089)
1213 LCDR M. A. Feher
LCDR J. D. Whyte (R)

522 AIRBORNE MISSILES & ASST. EVAL. FOR FIGHTER WEAPONS SYSTEMS (5080/5089)
1211 CDR D. S. Mackay

522A ASST. EVALUATION FOR AIRBORNE MISSILES (5080/5089)
1211 LCDR R. H. Gormley (R)

53 AIR TACTICS & TRAINING REQS. (5080/5089)
1207 CDR L. W. Abbott, Jr.
CDR B. E. Smith (R)

531 ASST. AIR TACTICS & TRAINING REQUIREMENTS (5080/5089)
1207 LCDR F. A. W. Franke (D)

54 MARINE CORPS LIAISON OFFICER (5080/5089)
1209 LTCOL H. E. Hood

Combat Direction Systems

60 DIRECTOR COMBAT DIRECTION SYSTEMS DIVISION (5318)
1000 CAPT J. R. Tucker

61 TEST OFFICER CDS (5343/5355)
1111 CDR R. T. Higgins (R)

611 AIR & CARRIER TEST CDS (5319/5341)
1119 LCDR J. Abbott (R)

612 SURFACE & UNDERSEAS TEST CDS (5319/5341)
1119 LCDR D. A. Oliver, Jr. (R)

613 ELECTRONICS MATERIAL TEST CDS (5319/5341)
1111 CDR R. H. Lee

62 EVALUATION OFFICER CDS (5342/5355)
1101 CDR B. E. Colhill, Jr.

621 AIRBORNE EVALUATION CDS (5342/5355)
1107 LCDR R. J. Laughton

621A CARRIER EVALUATION CDS (5342/5355)
1107 LCDR M. D. Short (R)

622 SURFACE EVALUATION CDS(5342/5355)
1107 LCDR G. H. Wilson (R)

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63 TACTICS & TRAINING REQS. CDS (5319/5341)
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Desk sign of the month:

If you aren't confused, then you just aren't well informed.

* * *

R&D at the Agricultural Experiment Station

It had to come, we suppose, even though it drives one more nail into old Dobbin's coffin. Out at the Agricultural Experiment Station, Beltsville, Maryland, scientists have been busily concocting a mixture of grasses, fodders, and corncobs into something to fill a crying need of the mushroom growers personified by the American Mushroom Institute. The product? Oh yes. It's synthetic manure.

* * *

How to make a dry martini

Two Washington manufacturers' representatives were discussing how to make the driest martini. The recipe they finally decided upon was to pour in the gin and then whisper, "Vermouth," across the surface. The bartender tried it out and got along well until it came time to add the whisper of vermouth. As the bartender said the word the reps cried in unison, "Not so loud! You'll ruin it."

* * *

U. S. advertises loose morals

A foreign air force officer who recently arrived in Washington to become air attache for his country told us that he was shocked by the "open display of sex-mindedness on the part of America." Asked what he meant specifically, he said, "As I drove along your highways it confronted me again and again. First it was 'Soft Shoulders'; then 'Dangerous Curves'; 'Five gals for $1.00'; 'Try Ethyl'; and finally, 'Watch Out For Children.' "

* * *

Small bit of bull

As he held her close while dancing at the Shoreham Terrace, our friend from the wide-open spaces was giving his girl friend the old Lone Ranger line: "Honey, I'll love you 'til the cows come home."

"That's nice," she replied, "But, meantime—lay off the calves."

* * *

Pity

Pity the poor little rich boy whose father bought him a foreign car and now he has to shift for himself.

* * *

It isn't easy

A Washington girl married a trade association executive here in the District and after a few months complained to her aunt about her husband's drinking. "Well, if you knew he drank why did you marry him in the first place?"

Confessed the bride, "It isn't that easy. You see I didn't know he drank until one night he came home sober."

A bum steer

As the Texan arrived at the gates of his eternal home, he looked through the bars and remarked, "Gee, I never thought Heaven would be so much like Texas."

"Son," said the man at the gate sadly, "this isn't heaven."

* * *

Careful is the word for one girl-type Government worker in this story:

First BuWeps steno: "Tell me, if a kind genie came along and offered you two wishes—what would you wish for?"

Second BuWeps steno: "Well, I'd wish for a husband."

"That's one. What's the second wish?"

"Oh, that one I'd save until I saw how he turned out."

* * *

. . . and in another BuWeps office . . .

"Jim," said Spence to his lawyer friend, "what'll you charge for getting me a divorce?"

"My regular fee is $125, Spence, but I don't like divorce cases—why do you want one?"

"I want to marry my sister-in-law."

"Something like that could be misunderstood and cause a lot of talk. Why don't you go home, think it over, talk to your friends and neighbors—then if you still want the divorce, I'll take the case."

Three days later Spence was back. "Your advice was good. I've changed my mind. I don't want a divorce now."

"Fine! Fine! And what changed your mind?"

"Well, I went home and talked it over with my next door neighbor. When he saw how my problem was bothering me he admitted he has been spending time with both my wife and my sister-in-law and he says there isn't $125 difference."

* * *

From British Embassy files

Seems that two English school boys struck sparks every time they saw each other and it became evident that this enmity carried over into their adult life. One rose to be an Admiral of the British Navy and the other became a Bishop in the church. One day they met quite by chance on a train platform and recognized each other. The Bishop walked over, eyed the Admiral's uniform and said, "I say, Stationmaster, when does the next train leave for London?"

The Admiral looked at the Bishop's long robes and his ample waist line before replying, "At 2:30, Madam, but I shouldn't be traveling in your condition."

* * *

Ever noticed?

Some girls are like prize fighters. They won't go into action until they see a ring.

The French have a word for it

Then there was the Pentagon girl who went out on a blind date with a Frenchman. She returned to her apartment with her stockings in her hand, her hair disheveled; her dress badly rumpled and her lipstick smeared off.

As she flopped into a chair her roommate asked, "What happened?"

"Well, it was this way," she said, "I didn't want him to know that I couldn't understand a word of French, so I kept nodding my head."

* * *

Special project

One distinguished Naval Research Lab executive we know dislikes formal social functions that he is often forced to attend. At one particularly dull affair he had worked his way toward the door with the expectation he could slip out unobserved and get some work done in his laboratory. Before he could make the break, his host spied him and declared in a loud voice that it certainly was a great honor to have such a distinguished scientist in his house. "Tell me, Doctor, just what are you working on now?"

"My exit," was the straight-to-the-point reply.

* * *

After the party . . .

Chap we heard about wobbled out of the Army-Navy Club, made heavy weather down to K Street, came up to a parking meter, fumbled a coin in the slot, watched the needle go up to 60, and was heard to say, "Thish ish terrible. I'm shicker than I realised. I've losht a hundred pounds."

* * *

Pentagon coffee-bar chatter

"My wife used to be scared to death that someone would steal her mink coat and her Dior originals."

"Why doesn't she have them insured?"

"Oh, she had a better idea than that. She hired a fellow to stand in her closet and watch them. I happened to find him there last night when I came home."

* * *

School daze

A Fairfax County mother got a note from little Johnny's teacher, "Johnny is really a good student and would do well in his grades if I could find some way to get his mind off the little girls."

Mother wrote back: "I wish you'd let me know if you find a way. I'm having the same trouble with Johnny's father."

* * *

Man, like you're too far out

Someone in the office of Congressman Bill Widnall (R., N. J.), phoned the research office of the Library of Congress and asked for an account of . . . "the economic progress of the United States from Colonial times to the present." The voice on the other end of the line quickly replied, "I am very happy to tell you that you have the wrong number."

"Aerodynamically it appears sound, but we can't get enough appropriation."

* * *

A Reflection on the Fifties

A favorite pastime in Washington is to give a label to the late but perhaps not too lamented Fifties, presumably as seen from one branch of society or the other. Here is one list making the rounds:

Congressional Investigators:	*Fixed Fifties.*
The Beatnicks:	*Fossilized Fifties.*
Cigaret Makers:	*Filtered Fifties.*
Paperback Books:	*Freudian Fifties.*
Fifth Amendment Takers:	*Forgetful Fifties.*
Censors:	*Filthy Fifties.*
Cape Canaveral:	*Fizzling Fifties.*

* * *

Said the fly on the mirror, "Well, that's another way of looking at it."

While questioning Air Force Chief of Staff Thomas White about America's position in the space race, Congressman Ken Hechler (D., W. Va.) put on a pair of rose colored sun glasses. Then he removed the rosy specs and put on a pair of dark ones. "All right, General," he wanted to know, "which way do you see things?"

* * *

My wife is the drip over there

Washington's most hazardous cocktail party of the season undoubtedly was a reception given recently by General Motors. Some carpeting came loose and tripped guests carrying drinks up a short flight of stairs. Those who managed to avoid this obstacle had to run the gauntlet of some long bottom branches of a potted palm at the top of the stairs. No one was hurt, but victims could easily be identified the rest of the evening by the large liquor stains on their backs.

ALL TELEPHONE NUMBERS THROUGH USS RANDOLPH EXCHANGE

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Rear Adm. J. E. Clark
Ext. 009

PUBLIC INFORMATION OFFICER
Lcdr. M. A. Micheal
Ext. 009

CHIEF OF STAFF & AIDE
Capt. P. N. Shuster
Ext. 009

FLAG SECRETARY
Lcdr. J. D. Adkins
Ext. 009

AIDE-FLAG LIEUTENANT
Lt. R. A. Costigan
Ext. 009

COMMANDING OFFICER USS RANDOLPH (CVAIS)
Capt. R. E. Harmer

HS-36 (S2F)
HS-7 (HSS1)
VAW-12 (AD-SW)

ASSISTANT CHIEF OF STAFF FOR OPERATIONS & PLANS
Capt. E. R. Fichenscher
Ext. 000

COMMANDER SUBMARINES USS COBBLER
Lcdr. F. F. Clifford

COMMANDER DESTROYER SQUADRON 28 USS WALLER DDE446
Capt. G. M. Slonim

HUNTER KILLER FORCE ASW-SURFACE SUBMARINE
Cdr. G. A. Kelley
Ext. 394

ASSISTANT CHIEF OF STAFF HUNTER KILLER FORCE ATLANTIC
Cdr. W. M. Simons
Ext. 394

HUNTER KILLER FORCE ASW-AIR
Lcdr. P. E. Le Blanc
Ext. 394

PLANS
Cdr. W. R. Sams
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OPERATIONS
Cdr. R. ... Ryzow
Ext. 000

COMMUNICATIONS
Lcdr. P. W. Johnson
Ext. 349

LOGISTICS
Ext. 421

ASSISTANT PLANS AIR
Lcdr. W. V. Garrison
Ext. 000

INTELLIGENCE
Lcdr. W. T. Mitchell
Ext. 421

ASSISTANT OPERATIONS AIR CIC
Cdr. V. B. Rink
Ext. 421

ASSISTANT OPERATIONS SUB-SURFACE
Ext. 421

ASSISTANT OPERATIONS NAVIGATION
Cdr. J. A. Jones
Ext. 225

ASSISTANT OPERATIONS ROYAL CANADIAN NAVY
Lcdr. R. C. K. Peers
Ext. 421

ASSISTANT OPERATIONS SURFACE
Lcdr. R. F. Wheeler
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ASSISTANT OPERATIONS AEROLOGY
Lt. J. B. Kagle
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TASK GROUP ALPHA

UNLIKE THE EVALUATION activities, Task Group Alpha, with all the tools and teamwork are the real testers in ASW. They do not obtain the statistical data on a particular piece of equipment. Their's are the practical tests, those that include all factors from equipment probability figures to psychological problems of the operators.

A typical operation for Task Group Alpha is finding a friendly sub. The sub is given a day to get lost. Then around the clock, day after day, the complete Task Group with all its company of destroyers, carrier aircraft, helicopters, submarines, and the long-range patrol aircraft, try to find the sub. They use everything from sonar to magnetics in their efforts. There are no limitations to the submarine or the forces trying to find and destroy him. In this case, however, they force him to surface, rather than destroy him. When the sub comes up, the cycle repeats itself. They try once again to make the oceans transparent.

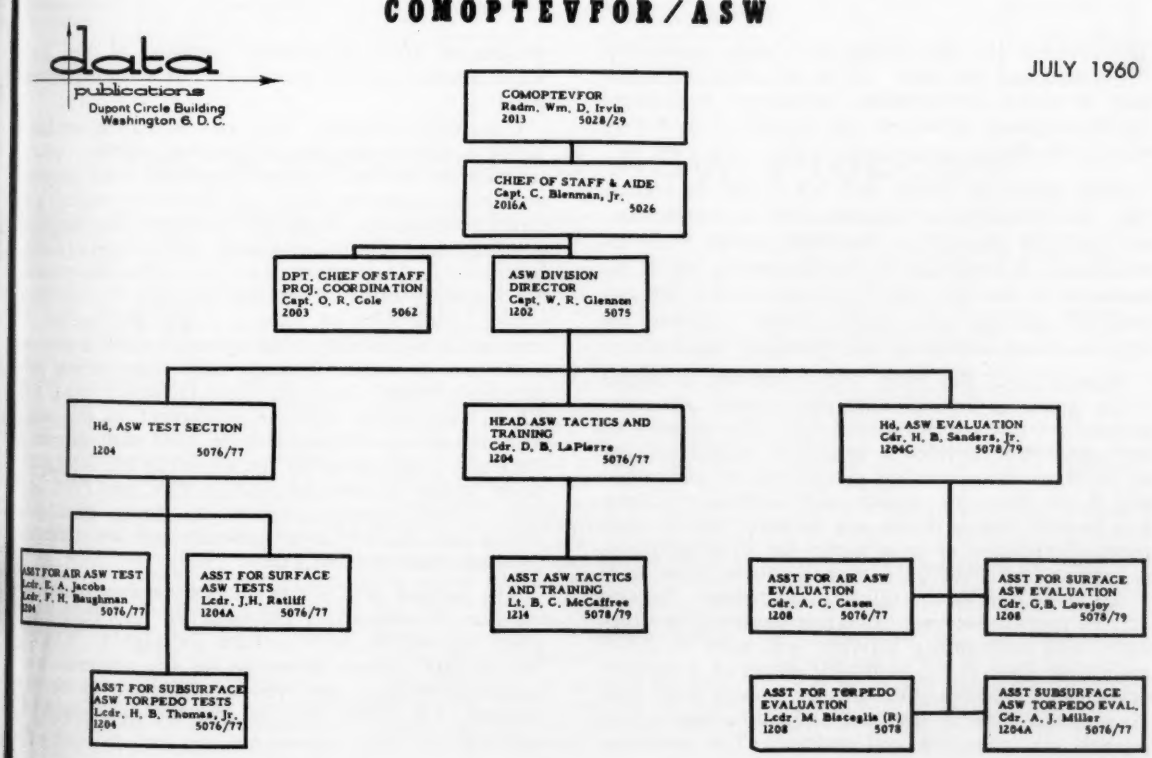
The tactics recommended by the evaluation activities are normally employed, but if they fail, they are changed and re-tested. The Task Group works closely with the Development and Test Activities of Commander Operational Development and Test Force, through "type commanders".

If, for example, the helicopter can be controlled better by a method employing less controller training—such as the DASH system—the recommendation is made, and the method is normally changed.

In the triple role of the Task Group, operational training of everyone concerned under realistic conditions is a major function. It is one thing to teach a man at school how an operation is performed. It is another to have him do it as it is supposed to be done. With the Task Group—everyone learns.

Sailors, submariners, and aviators may not know much about ASW when they report for duty in Task Group Alpha, but it's a sure bet that when they leave, they will have abundant knowledge.

To the contractor who has a possible answer to an ASW problem, Task Group Alpha is the place to check the formula. It is relatively easy to visit the Group. Normally, all that is needed is permission from the Office of the Chief of Naval Operations; and this is readily obtained. ■



Operational Test and Evaluation Force

THE OPERATIONAL TEST and Evaluation Force is an operational fleet command under the administration of the Commander in Chief, Atlantic Fleet. The Commander of the Force has primary responsibilities to the Chief of Naval Operations in the areas of test and evaluation. OPTEVFOR, as assigned, also has responsibilities to the CNO in the area of development.

In the area of test and evaluation, OPTEVFOR conducts tests of weapon systems, support systems, components, equipments, and materials. They make comments and recommendations to the CNO on these tests. They also recommend training procedures, training aids, countermeasures, and basic tactical doctrine to the Chief of Naval Operations.

In the area of development, COMOPTEVFOR assists in development projects which require an operational environment, by providing their facilities and services to other naval agencies. They also report to the CNO on development projects with comments and recommendations. This is done chiefly to prevent duplication of effort within the Navy.

As tools to carry out the mission of COMOPTEVFOR, the Force has under its command: The Surface Antisubmarine Development Detachment, Key West; The Mine Warfare Evaluation Detachment, Key West; The New London Development Detachment; and the Guided Missile Evaluation Detachment, Puerto Rico. In addition, COMOPTEVFOR includes four Air Development Squadrons; XV-1, XV-3, XV-4, and XV-5. Some 25 ships are regularly assigned to COMOPTEVFOR, as well as other ships temporarily assigned for special testing and evaluation projects. The Commander, Operational Test and Evaluation Force may also call upon the Submarine Development Group TWO, Atlantic; Destroyer Development Group TWO, Atlantic; and the Destroyer Development Group, Pacific. ■

VX-1, A Stamp of Approval

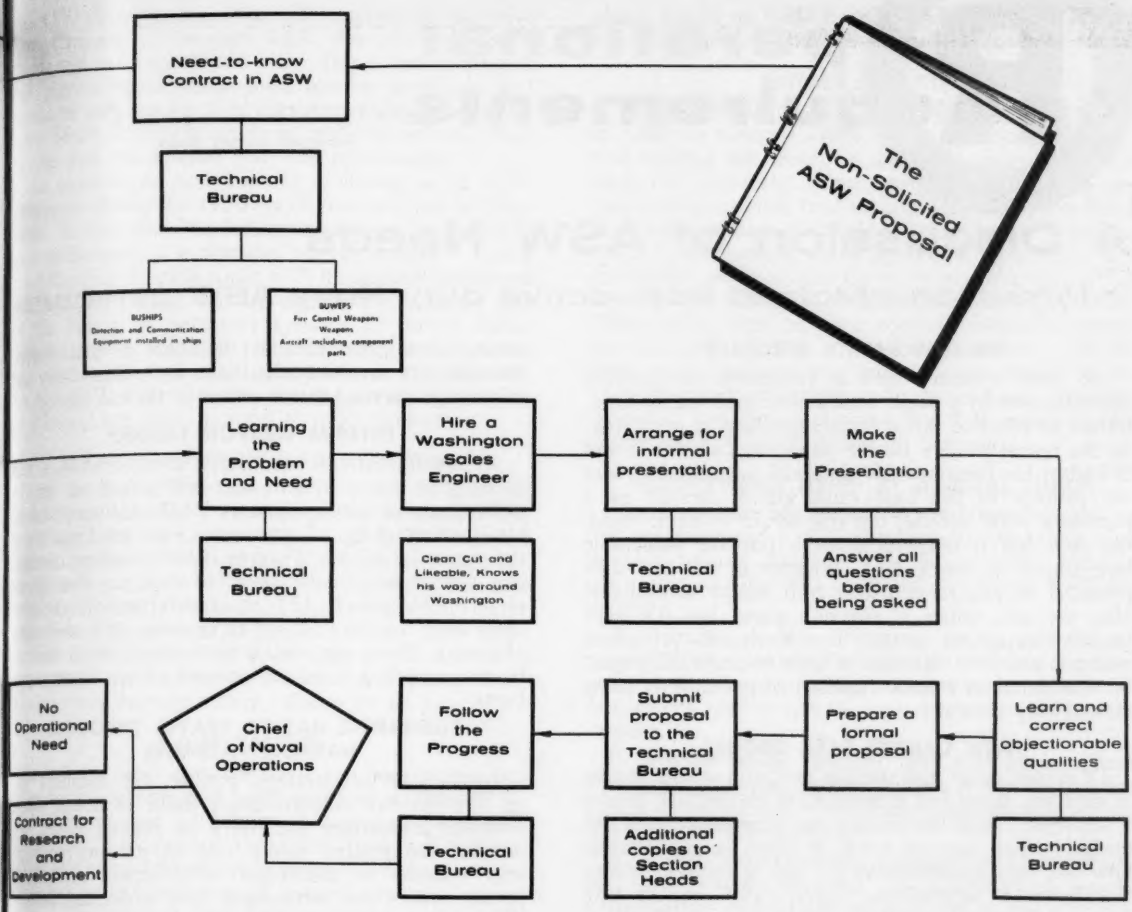
BETWEEN the first design of a new fleet ASW system and the final write-up of tactics lie many steps of design, development, testing and evaluation. Air Development Squadron One, located at NAS Key West, is the final cog in the train.

Many personnel linked with VX-1 feel its present title, Air Development Squadron One, is a misnomer. Actually, the mission is evaluation rather than development. It encompasses the tremendous job of assimilation of test data and the reduction of it through technical analysis to a useable form; a project far beyond the capabilities of the operating squadrons.

Based at NAS Key West, VX-1 represents a sample of the operating fleet to which new systems and some devices are referred for evaluation. The purpose of the squadron's activities is to decide whether or not an ASW or mine warfare component is worthwhile and if the fleet can operate and maintain it. Once it is decided that a device can be used and is worth using, formulation of basic tactics for its employment is begun. The squadron is usually two to three years ahead of the fleet in its evaluation operations. Projects may be turned over to it in various phases of development, and occasionally BuWeps will refer to XV-1 as a brain trust in the beginning stages of a device's development. Some equipments go through more than 30 separate steps of test and evaluation before final reports are compiled and written. The complete analysis of XV-1 is generally accepted as final, and a few gadgets survive down from this scientific testing group.

Concerned primarily with anti-submarine warfare, XV-1 is actively interested in mine warfare, which recently has received renewed emphasis. Such projects as mine sweeping by rotary and fixed wing aircraft are future probabilities. Different equipments and weapons generally are evaluated as systems rather than as single instruments. Major factors in the evaluation process are feasibility of equipment maintenance by fleet personnel, availability of parts and the percentages of accuracy and reliability when operated under strenuous conditions of carrier landings, salt water taxiing and extreme weather. It is with these factors in mind that XV-1 conducts its tests on equipment in the same type aircraft in which it will be used with the fleet. Currently under study by the squadron are integrated ASW tactical systems intsalled in P2V and P5M aircraft. These systems include the newly developed JULIE and JEZEBEL equipments, and are undergoing operational suitability tests.

The position of XV-1 in the Navy today personifies the Navy's tremendous emphasis on perfecting foolproof and reliable ASW systems and tactics. Whether present day systems prove to be the answer, or if additional systems and devices will have to be developed, XV-1 will have to give the final stamp of approval. ■



The Non-Solicited ASW Proposal

THERE are many ways of making a non-solicited proposal in the ASW field. DATA has made a survey of the various methods, and come up with, what we believe to be, the best method of approaching this problem.

First on the list is to get a non-funded, need-to-know contract from the technical bureau in question; BuShips—for detection and communication equipment installed in ships; BuWeps for fire control equipment, weapons, and aircraft including component parts. Normally, a simple letter to the appropriate Bureau is sufficient to get the ball rolling.

The need-to-know contract is an important item. It permits the company to learn all about the classified problems, concepts, and theories in the ASW field. Considering the attrition rate of proposals it's a real money saver to investigate the complete field before the first dollar is spent. The need-to-know contract unlocks the doors.

Once the door is open, it's good policy to make personal contact with the section heads and assistants. The main item on the information list is to check for parallel proposals, both past and present —including the current contracts for R & D. Meet the old hands in the development business. Their memory is normally more fruitful than filed records. If the situation warrants it, a check should be made with the Navy's Operational Development and Test Force people in Norfolk, Virginia. Personal contact here can be a big help. They can also guide you to the proper assistants in the CNO office, for more information. After an analysis of the complete picture and you're still not disallusioned about the need of the proposal, the first hurdle is past.

Now it takes more than baseball hats, tie clasps, cigarette lighters, etc., it takes a clean cut likeable sales engineer, usually an ex-Naval Officer who knows his way around Washington. He is the man to hire and arrange for an informal presentation to the appropriate technical Bureau. He is also the man to assist in making the presentation.

Preparation for the informal presentation is a big, if not major, item. It must answer and prove all questions before they are asked. A better mouse trap can be sold these days, especially if it is cheaper. But don't let this be your criterion. As an example of how a proposal was presented in the past; the manufacturer of a low altitude ejection seat merely pointed out that many ejections at low altitude are fatal. He demonstrated how his product would change this. He won a major contract.

With the presentation out of the way, it's time for the Washington Sales Engineer to make the rounds in the Bureau to learn all the objectional qualities for correction before the formal proposal goes in the mill.

Once you have got everything wrapped up in a pretty presentation book, it is sent to the same Technical Bureau. When mailing or submitting the proposal, make sure advance copies are sent to the individuals in the appropriate sections. This is really a time saver, as it permits a leisurely study before the official routing copy hits the pile on the desk.

The job is now done. All the Sales Engineer must do is check the progress and guide it to the decision boys in the Pentagon.

Operational Requirements

expressed military needs

A Discussion of ASW Needs

Information obtained from active duty Navy ASW personnel

THE ASW PATROL AIRCRAFT

An ASW system which is vulnerable to potential neutralization by a single attack is of little use as a deterrent or effective threat force regardless of capability. In the recent past, a sizable percentage of the R and D budget has been in ASW potential as utilized around the concept of the long range patrol aircraft as a necessary ASW vehicle; but still, in the strategic mind, the fact that it operates from a possible vulnerable base cannot be overlooked. Whether or not the ASW potential of long range patrol craft would be available after the dust settles is anyone's guess, but it's risky business to merely assume that it would. A system where R and D in defenses of support probability must be considered as a basic function of potential is being viewed very carefully.

ASW CARRIER TASK GROUPS

Of course some post nuclear potential would remain in the form of our fast moving ASW carrier task groups if deployed. With the existing and planned units in this budget-limited type of force, it again is questionable how long they would survive in a war of attrition against five hundred submarines. Naval ASW carrier task forces, in present concepts, could be considered of limited post nuclear value without the support required to keep them effective.

The "attack" aircraft carrier serves its deterrent purpose as a mobile retaliatory platform of immediate use on A-Day. The ASW Carrier to be effective must survive and be supported to accomplish its purpose.

SUBMARINE BURGLAR ALARM NEEDED

It is quite evident that Russia did not exclusively participate or wait for long range development of complicated devices, but decided to use the element of the unsolved submarine defense by quantity for saturation. With the aggressor having the advantage of surprise, the reason is simple: the five hundred Soviet submarines will be at sea to avoid retaliatory destruction at a base. Perhaps this is why Vice Admiral John S. Thach (Mr. Big in ASW) lists as one of the ten needed items from industry as a "Submarine Burglar Alarm System," a vital device in early warning intelligence.

SATURATION

A sure method being given careful consideration at the top planning level to beat the probable Russian tactic of submarine saturation, is the concept of saturation itself. Saturation by existing detection concepts of long range patrol aircraft and ASW task forces is of doubtful value when consideration is given cost requirements to maintain sufficient numbers of these force The quantity involved must have the vulnerability a percentage survival factor added to the calculation.

INTERIM WEAPON NEEDED

At present there is a constant, if not frantic, searc in progress for a system that will afford an interi ASW potential while necessary R&D continues witho interruption along all avenues. The requirements the system: (1) *simplicity in commissioning, concep and operation;* (2) *invulnerable as a function of n clear missile attack;* (3) *rapid-high probability;* (4) *large area search;* (5) *self-supporting;* (6) *and tole able cost.* There are several methods in which this c be accomplished if utilized around certain known co cepts.

SUBMARINE HAS TO TRAVEL THROUGH NARROW PASSAGES

In the over all strategic picture, big numbers p up like the five million square miles of ocean whe Russian submarines are likely to roam. When y convert the present sweep rate of existing concep and systems as associated with actual operation forces, even a few submarines have a decided advan age when compared to the millions figure. Fortunate it is not just one big square body of water. The co tours where submarines can not roam serve a go deal to lessen the problem. A look at a chart revea certain paths through relatively narrow passages whe Russian submarines must transit to be potentia dangerous.

This factor could possibly be the reasoning behind move for long-life saturation devices or again a su marine burglar alarm system that could be sowed a monitored in vital sections of ocean by a small forc The cost of this potential is small since saturation d vices need not be used continually but held in inter readiness. The potential is great and two fold: (*They could be used in a critical period of anxiety; (2) They could be used by a small force calculated survive a possible A-Day.* Devices of this sort shou be simple "Yes" or "No" type apparatus with complicated large airborne counterpart. They shou be able to blend in with any mobile platform now existance. A low-cost saturation system of high prob bility to be held in reserve has been compared to comfortable poker hand.

INTERIM WEAPON HAS DRAWBACKS

The recently started race and emphasis on the "I terim" as a function of R&D has some serious dra backs. The general lack of authoritative expeditors

the ASW program leaves the old complaint of excessive time (five years) between R&D idea to operation; a factor still to be contended with. This common thought has pigeon holed many good interim proposals that would be satisfactory if in operation today, mainly because some drawing board hope could be put into effect by the time the interim plan was operational.

An example of past thinking is shown in the ASW helicopter during the 1950 era of research and development. At that time the helicopter sonar concept generated enthusiasm as a potential answer to ASW. Today the helicopter dipping sonar with its current limitations of range, cost, sonar and sea conditions, is merely one of the family of necessary systems for future R&D. The helicopter, although classified as an all-weather unit and capable of night utilization is not normally used in ASW after dark for obvious reasons. This line of thinking has been harmful to other projects.

LOCALIZE POSITION MAIN OBJECTIVE

The present effectiveness of existing operational forces is mainly based on their ability to localize the position of the submarine. This is a limited method since it centers around finding a submarine only after its possible presence has been determined by low and variable probability methods of intelligence. This factor is borne out by analysis of public talks on ASW given by high level ranks. Ten years ago, it was a joke to say that all we had to do was put a trapping circle around every burning tanker. Today it's no joke.

ASW TACTICS

Just about every possible tactic has been wrung out of existing concepts and equipments in an attempt to raise the inherent probability because of equipment limitations. Task Group Alpha and Bravo are continually at sea around the clock, training, developing, evaluating tactics and concepts of current and new equipments. They have at their disposal every possible ASW platform; the long range patrol plane, the land based P2V, and water based P5M; the carrier ASW plane, the S2F; the helicopter, the HSS; the radar search plane, the AD5W; the destroyer; the ASW submarine; and the nuclear submarine. They use radar methods, both active and passive; sonar, active and passive; sniffer equipment; magnetic airborne detection equipment, sonar and sonobuoys; and, of course, the "mark five eyeball." Some are effective, other limited. Weather and thermal water conditions give the submarine the most advantage. And the term "effectiveness" must always be qualified. If it is to be assumed that it is necessary for a submarine to get relatively close to a force to serve his mission, one degree of effectiveness may be obtained. However, if it is believed that the submarine is using modern surface to surface missiles and must be detected fifty miles or more away from the force, then naturally the outlook changes. Also there is a difference between finding *two* or *two hundred* submarines.

SIMPLE SYSTEM NEEDED

The need for a simple system that would make a high probability and rapid large area search is paramount in ASW R&D. It would bring the existing forces up to date and into an age or reality, even with current concepts and equipments. With this type system in operation, the interim could be relaxed and more emphasis placed on R&D for push button ASW to eliminate future need of forces and equipments.

FATIGUE A FACTOR

Along with many others, one of the biggest problems in ASW are methods where boring vigilance and analytical training are needed in the battle against complacency, and inversely, submarine hysteria. System display having multiple function and long operation hours of negative nature, normally develop human complacency. In reverse, the visual sighting of an oil slick in a probability area has been known to generate false MAD contacts and reception of submarine machinery noise. These factors must be given adequate weight in evaluation decisions to adopt a concept. Years ago, a British directional sonobuoy was selected over American designs because of simplicity in design and use. The time estimated to train an operator was five minutes. Our basic sonobuoy is still based on this one.

REQUIREMENTS LISTED BY ADMIRAL THACH

There are very few people in the Navy Department that are more aware of the problem at hand than Vice Admiral John S. Thach . . . Mr. Big in ASW. He lists ten urgent requirements from industry where R&D are needed:

1. Burglar alarms—*Warning systems that will indicate the presence and locations of submarines in deep ocean areas, in the moving areas around convoys or task forces, and in special areas not covered by other systems.*

2. Identification systems that will ensure that when our warning system flashes, it has been triggered by an enemy submarine; that there is in fact a burglar and not a stray fish.

3. A prediction system, similar to existing weather prediction systems, for forecasting sound propogation conditions at and below the surface of wide areas.

4. Central stations and prowl squads, mobile ASW forces, to ensure apprehension of submarines located by the warning systems.

5. Certain detection of any submarine which exposes any part of itself above the surface.

6. Provision in each ASW vehicle for the capability of finding, recognizing, and destroying submarines.

7. Discovery and utilization of phenomena, other than sound, for location of submerged submarines.

8. Weapons with range and accuracy equal to the detection ability of our forces' equipment, so that a submarine found can be a submarine destroyed.

9. Forces sufficient to accomplish the mission. Increase in the capability of our vehicles and equipment will result in proportional decrease in forces required.

10. Programs to meet these requirements along two parallel lines:

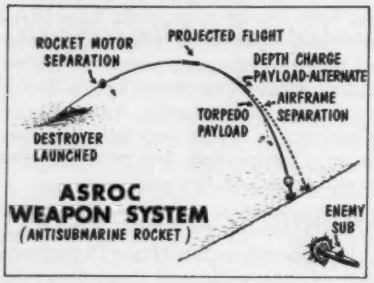
a. Interim—*Improvement of present equipment to counter the immediate threat.*

b. Long Range—*Research and development to counter the future threat.* ■

A Handy Glossary of ASW Terms, Activities, Projects and Weapons

ACTIVE WATER SEARCH

Method of locating nuclear submarines by sampling sea water in which minute traces of radiative waste from passage of submarine are measurable.



ASROC

Medium range rocket-carried homing torpedo or depth charge fired from surface vessels to the submarine contact area. A parachute is used as a range timing device in addition to its decreasing the water impact velocity to protect active and passive acoustic homing equipment. Previous homing torpedo techniques were used in R&D. Future R&D is expected to be in the improvement and miniaturization of acoustic homing equipment.

The most significant factor of ASROC is its versatility. It allows the launching ship to remain within the convoy and deliver a homing torpedo or depth charge to an enemy submarine several miles away. With the Honeywell computors, rockets can be fired as fast as the subs are identified and tracked.

The rocket follows a ballistic trajectory. Shortly before impact with the water, the motor and airframe drop off. If the payload is a torpedo, a parachute blossoms out to soften the landing. If it is a depth charge, the payload sinks to a pre-determined depth where it explodes with a wide kill area.

ASTOR with article

ASTOR

An antisubmarine torpedo which derives its name from that definition—**A**nti-**S**ubmarine **T**orpedo.

ARTEMIS

Project ARTEMIS is an exploratory development of a deep water, long range, fixed anti-submarine detection system.

ATLANTIS

Project ATLANTIS is a study conducted in 1959 to determine the technical feasibility of large ocean surveillance systems.

BETTY

Nuclear depth charge capable of being carried by most ASW airplanes. Developed partially as a submarine "localizer", and still available for immediate use, BETTY is fast being superseded because of current efficiency of cheaper, conventional homing weapons that do not have general nuclear hostility aspects.

CAESAR

Project CAESAR was a Caribbean test and evaluation believed to test using underwater explosion echos as a method of locating enemy submarines in conjunction with conventional equipment.

COMOPTEVFOR

Commander Operational Test and Evaluation Force. This group has the responsibility of testing and evaluating weapon systems, support systems, components, equipments, materials, tactics and procedures and as specifically assigned assume reporting and/or liaison responsibility in the area of development in order to improve the capabilities of the fleet and assist CNO in the direction of the Navy's research, development, test and evaluation programs.

DASH

Unmanned helicopters launched from destroyers and carrying anti-submarine torpedos. DASH gets is name from **D**estroyer-launched **A**nti-**S**ubmarine **H**elicopter. Ability to hover for long periods of time without having pilot along to get fatigued and further ability to be vectored by the locating sonobuoy have made DASH an ideal weapon. DSN-1, first DASH vehicle, is manufactured by Gyrodyne, is operational with fleet. DSN-2 and -3 are now in development. Being built by Gyrodyne.

EXPLOSIVE ECHO RANGING

Generally referred to as EER, it is an extreme long range method of locating hidden submarines by bouncing an echo from an underwater explosion off the hidden submarine and timing the echo's return to a fixed buoy. EER is also referred to as JULIE from the original Project JULIE which developed it.

FOXER GEAR

Foxer gear is a general term used to describe deceptive devices used by submarines in their attempts to delude the hunter-killer forces which are pursuing them.

Smudge Pots: These are smoke devices released by the submarine to fool odoriferous homing devices which ordinarily home on snorkeling submarines.

Fiz Tablets: Similar to giant-sized drug store-type Alka-Seltzer tablets, submarines release such effervescent devices to simulate bubbling action of the cavitation of their own screws. Thus acoustical homing devices and listening equipment designed to pick up submarine cavitation noises will only find worthless bubbles.

Noise Makers: Any one of a number of devices designed to simulate the noises of a submarine and thus confuse anti-submarine homing devices.

Oil Slicks: To make the hunter-killer forces believe they have a kill, the submarine can release false oil slicks or debris.

PC(H) Hydrofoil Boat

HYDROFOIL BOAT

Extremely fast hydrofoil boats now being developed and procured by the Navy can outrace even the fastest submarines, will carry MAD and other ASW equipment presently only found on aircraft. Navy has high hopes for these craft which raise out of water after getting "lift" on airplane type miniature wings. Newest innnovation is aircraft-type flaps on hydrofoil surfaces which are controllable, allow craft to ride swells and operate in higher sea states. Designated as PC(H) in fleet. Boeing recently received hydrofoil boat contract.

HYDROPHONE

Small listening device for passive ASW search equipment, used in sonobuoys.

Hughes HYDROSTREAK

HYDROSTREAK

The HYDROSTREAK is not to be confused with the hydrofoil. It is an entirely different concept. The hydrofoil type rides on pitched blades in the water, while the new hydro-skimmer type rides on a cushion of air. Skegs on the sides and a wall of water on the ends contain this air cushion, allowing little to escape. In this way water friction is nearly eliminated. The craft is propelled by conventional methods, the prototype having twin outboard screws.

The advantage of this type of craft is readily seen. Once you have invested enough power to lift the body of the craft clear of the water, each additional unit of power gives you an increasing amount of speed. This is not true with conventional craft. The advantage over the hydrofoil is similar. To propel a large ship by the hydrofoil method is not economical. By far the major part of the vessel would have to be engine and fuel tanks.

The future of this new concept remains to be seen. Right now it is very primitive (This reporter knows. He rode in it), and only slightly appropriated. However, it should be a growing field, and a good one to get into on the ground floor. Someday it may be far ahead of the hydrofoil. BuShips is anxious to hear new ideas to improve this type of water transport. Already they are at work on improvements to the prototype.

JEZEBEL

A special project involving a passive sonobuoy method of fixing the position of submarines wherein the buoy listens for noise from the submarine and transmits its findings by means of a radio transmitter to the search ship or aircraft which dropped the sonobuoy. JEZEBEL is hot! Highly classified, the JEZEBEL project is called by many ASW officers, "the Navy's strongest hope in the future of ASW." Navy is reported to be working feverishly to integrate JEZEBEL equipment with the SSQ-3 sonobuoy. Appears to tie-in with JULIE although nothing released on this.

JULIE

Explosive Echo Ranging project in which explosive charges released from buoys explode at predetermined depth and time of echo receipt after reflection from submerged submarine determines distance from buoy. Echo circles from two or more such buoys intersect to show exact location of submarine. Highly classified equipment has great range.

LOFAR

Similar to SOFAR; believed to be a long range orientation for fixing and ranging using depth charge explosions. Nothing released.

LULU

LULU is a nuclear depth bomb of high priority in the fleet. Most details are classified.

MAD on S2F aircraft

MAD (Magnetic Airborne Detection or Magnetic Anomaly Detection)

Passive and highly sensitive measuring device that detects changes in the earth's magnetic field caused by submarines and other ferrous bodies. Standard on all airborne vehicles, the equipment amplifies changes detected through the magnotometer usually located in the aircraft tail section to remove it from aircraft influences. Used primarily for identification because of the extremely short range . . . only about 800 feet, R&D is underway to increase the sensitivity and miniaturize the components.

MAD is now called Magnetic **Anomaly** Detection rather than Magnetic **Airborne** Detection because now hydrofoil surface ships in addition to aicraft are carrying it. (**Anomaly** is a difference in the earth's magnetic lines of force.) MAD is fastest-sweeping ASW device.

Texas Instrument handling production, R&D by Airborne Instruments, Patents by Gulf Oil.

ODORIFEROUS HOMING

See Sniffer Gear.

PADRE

This is a Pilot's Automatic Dead Reckoning Equipment which is a combination ground position indicator and DRT (Dead Reckoning Tracer) designed to be held in the lap or temporarily mounted in an aircraft cockpit during ASW operations. The pilot can plot directly on the scope to show the relative position between himself and the submarine.

PC(H)

A hydrofoil anti-submarine search and killer ship which lifts out of the water and rides on planing surfaces similar to the way a wafer skiier stays above the waves. The PC(H) is scheduled to operate in pairs in a "buddy" system in which one ship will listen while the other races in for the kill.

RETORIC II

A research program for advanced torpedo design.

SALINITY

Amount of salt content in sea water. It has effect on some ASW search equipment.

Searchlight on P2V aircraft

SEARCHLIGHT

Searchlights are currently wing-mounted on anti-submarine aircraft such as the P2V and S2F for night ASW searching. The shadow from a snorkel or periscope is greatly elongated and easy to see when a bright light shines on it from a distance. Currently the AN/AVQ-2C searchlight manufactured by the Strong Electric Co. of Toledo is the standard searchlight being used by the Navy in ASW operations although Strong Electric is only providing components at this time.

SNIFFER GEAR

True title is Odoriferous Homing. Contamination of atmosphere by snorkeling submarine ionizes air. Sensitive homing device picks up ionization traces and follows them upwind to greater intensity and location of hidden snorkeling submarine. Since majority of Russian subs are of the snorkeling variety, Sniffer is very useful, has had exceeding good results in ASW exercises with range far in excess of original expectations.

SOFAR

Sound Fixing and Ranging, SOFAR was the basis for the development of the JULIE or Explosive Echo Ranging method of finding submarines. Originally designed for pilot rescue, downed flyer releases an explosive charge from his raft which explodes at a predetermined depth. Sound waves at great depths travel long distances at great speeds so that knowledge of the aviator's position is possible.

SONAR, ACTIVE

An apparatus that detects the presence of a submerged object by detecting any noise (sound frequency) emitted by the submerged object is a passive sonar device. Passive sonar is strictly a listening device and sends out no signal of its own.

SONAR, DIPPING

Active and passive acoustic light weight sonar carried by the ASW helicopter. Lowered into the water by a winch/cable configuration, the transducer permits a 360 degree active or passive sonar search. Present equipment is the AQS-4 developed by Raytheon. Future R&D expected to be in equipment miniaturization, including transducer cable which because of present weight limits the depth lowering factor for optimum results.

Currently in use in the fleet with HSS-type Sikorsky helicopters, tactics are to (1) hover, (2) dip, (3) ping or listen.

SONAR, PASSIVE

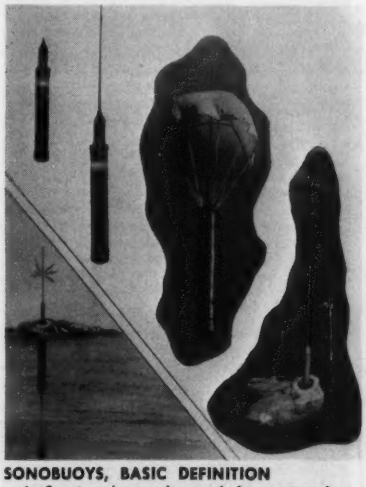
Active sonar devices are those which send out various types of sound frequencies to be reflected from the submerged target and return as an echo to the listening sonar device.

SONAR, SQS-26

Large, high-powered, low-frequency sonar for surface ships.

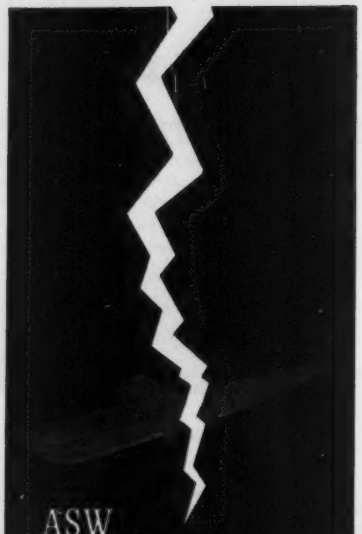
SONAR, VARIABLE DEPTH

Sonar that can be towed by a destroyer and its depth controlled by varying the length of cable.



SONOBUOYS, BASIC DEFINITION

A floating buoy dropped from aircraft in the vicinity of a suspected enemy submarine is a sonobuoy. The sonobuoy contains a miniature passive sonar set and radio transmitter. The sonar set picks up water-borne noise from the submarine and transmits this information to the monitoring aircraft. By laying a pattern of buoys, the aircraft can fix the submarine's position within the pattern.



ASW ENGINEERS SALARY TO $20,000

Several immediate, high-level assignments are currently available for qualified Anti-Submarine Warfare Engineers in Hughes-Fullerton's new Underseas Warfare Department. These assignments are concerned with design and development of advanced underwater intelligence systems for ASW applications. Urgent requirements currently exist for:

Information Theory Specialists: Experienced and interested in: ■ Statistical Modeling of Noise and Signal Fields ■ Application of Statistical Decision Theory to Advanced Information Systems ■ Mathematical Studies of Signal-Noise Discrimination.

Circuit Design Specialists: Competent in the field of Low Noise Amplifiers for ASW Applications.

Systems Synthesists: Unusually creative engineers who: can reduce vague requirements to useful technical terms ■ Apply imagination leading to new approaches and new concepts ■ Describe engineering implementations to meet the system requirements ■ Are qualified in: information processing systems using sampling and correlation techniques; broad studies of the present and future physical and military environment of the submarine.

Located in Southern California's Orange County (the nation's fastest growing electronics center), Hughes-Fullerton offers you: a stimulating working environment; private or semi-private offices; long-term stability.

CALL COLLECT TODAY! For complete information on these challenging assignments, call us collect today! Ask for:

Mr. B. P. RAMSTACK at: TRojan 1-4080, ext. 3741.

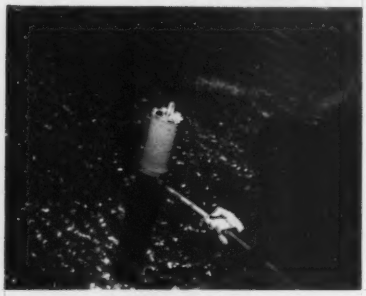
Or, airmail resume to: HUGHES-FULLERTON R & D, P. O. Box 2097, Fullerton, California.

HUGHES

Hughes Aircraft Company

SONOBUOYS, EXPENDABLE

Passive listening devices, dropped from aircraft that receive and transpond acoustic noise generated in the ocean to a radio receiver in the airborne ASW vehicle. Latest production model is the SSQ-3. In the R&D phase, Admiral Burke recently told the House Subcommittee on appropriations that success is being obtained in JULIE and JEZEBEL sonobuoys. R&D is underway to increase sensitivity, range and life of the power supply. **The outlook:** the sonobuoy in R&D is expected to have priority because of the emphasis on the airframe as a primary ASW platform and the sonobuoy giving it remote access to the medium of the submarine.



AQS-4A Sonobuoy

SONOBUOY, SSQ-3

Most popular sonobuoy now in the fleet.

SONOBUOY, SSQ-28

Reported to be the latest sonobuoy.

SUBIC

A study of submarine integrated control systems.

SUBROC

Medium range, solid propellant, rocket launched homing torpedo from a submerged submarine to the surface. After becoming airborne, the system is similar to the ASROC. The weapon gives the ASW submarine a decided attack advantage from "quiet" listening depths where long range passive listening is sometimes possible. Future R&D is expected to have emphasis on launching technique and initial surface guidance. The detection and ranging problems at SUBROC's long ranges must be better solved to take advantage of SUBROC's possibilities. Range is 25-50 miles. Built by Goodyear.

SURASDEVDET

SURface **A**nti-Submarine **DEV**elopment **DE**Tachment presently headquartered at Key West, Florida. SURASDEVDET conducts tests of shipborne antisubmarine weapon systems, support systems, components, equipments and material in accordance with projects assigned.

TASK FORCE ALPHA

Task Force Alpha is an antisubmarine carrier task force currently made up of an antisubmarine carrier (CVS), two target submarines (SS) and six P2V NEPTUNE aircraft. This force is charged with developing antisubmarine aircraft carrier tactics.

TERNE

Norwegian designed ASW missile which USN is now buying from Kongsberg Vapenfabrikk to supersede Weapon ABLE.

THERMOCLINE

Difference in temperature in sea water which makes problems for sonar search equipment.

THRESHER

An antisubmarine nuclear submarine.

MK 37-1 Torpedo

TORPEDOS FOR ASW

MK 37-1 is a surface and submarine guided antisubmarine torpedo.

MK 46 is a lightweight, high-speed, homing antisubmarine torpedo.

MK 43 Mod 1 is a searching and automatic-homing antisubmarine torpedo which is currently the most highly respected and favored search torpedo in the fleet. It makes two circle searches and if unproductive then sinks to the bottom. Its speed is very high and it can outrun all but the very fastest submarines. MARK 43 Mod 1 is electrically propelled and homes on the cavitation noises of the submarine's screws. It can be dropped by either ships or aircraft. It is manufactured by NOL at Forrest Park.

TRANSDUCER

In ASW, a mechanism for changing sound waves to electrical impulses.

TRAPPING CIRCLE

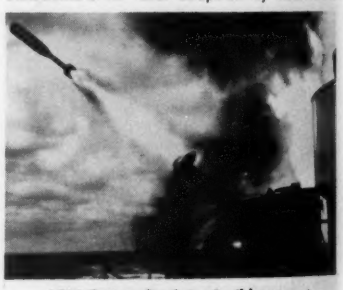
A circle flown by an aircraft over an area which is suspected to contain an enemy submarine. The diameter of the circle is arbitrary. Trapping circles are generally used in relation to MAD contacts.

TRIDENT

Project Trident is an exploratory development project assigned to the Bureau of Ships to determine by experiment if the conclusions of the ATLANTIS study are valid.

VX-1

Air Development Squadron One, based at Naval Air Station, Boca Chica, Key West, Florida. This activity studies and evaluates antisubmare for later adoption by fleet units.



ABLE being fired in Caribbean test

WEAPON ABLE (ALPHA)

Operational short range rocket fired depth charge detonated with either contact or proximity fuse. Standard equipment on most ASW Destroyers (DD) and Destroyer Leaders (DL) the weapon is preguided by shipboard sonar equipment and permits submarine destruction while closing the range where contact is sometimes lost. The device will be replaced by semi-long range rocket launched homing torpedoes, and is therefore already becoming obsolescent. ■

DATALOG OF MISSILE, SPACE, AND DETECTION PROJECTS

MILITARY MISSILES, July 1960

★ *New information this month*

AA—Air-to-Air
AS—Air-to-Surface
AU—Air-to-Underwater
SS—Surface-to-Surface
SA—Surface-to-Air
SU—Surface-to-Underwater
UU—Underwater-to-Underwater
ICBM—Intercontinental Ballistic Missile
IRBM—Intermediate Range Ballistic Missile
ECM—Electronic Countermeasures

ARM AF

Type: AS
No contracts announced.

New Anti-Radar Missile now in early study phase. FY '60 funding is $23 million.

ARROW Army

Type: AS
prime: Grand Central Rocket
guide: Unguided
power: Grand Central Rocket

★ Launched from helicopter or medium-weight Army a/c, ARROW rocket motor burns out at from 5000 to 7000 ft and coasts upward to apx. 45,000 ft. With a 6-lb payload, separation is req from 5000 to 7000 ft in order for this payload to coast upward to 120,000 ft. Payload is needle-nosed enlarged to apx 2 in O.D. and enters target area almost vertically. Ideal surprise attack weapon.

ASROC Navy

Type: UU
prime: Minn.-Honeywell
length: 15 ft.
Dia: 1 ft.
weight: 1000 lbs.
guidance: stabilizing fins

★ Development cost $65 million. ASROC equipped ships locate & track subs, computor charts course, range, and speed of sub and aims launcher. Ship commander orders fire of missile with either torpedo or depth charge payload. Missile follows ballistic trajectory to target area. During flight rocket motor and air-frame drop off at pre-determined signal, controlling trajectory. Depth charge payload sinks and detonates at predetermined depth. Torpedo payload is eased into water by parachute and attempts to locate sub by acoustical homing search pattern.

ASTER Navy

Type: SU
prime: Applied Physics Lab/Vitro
guide: Ford
power: Allegheny/Rocketdyne
range: 30 mi.

Ship launched TERRIER carries ASTER torpedo to surface destination, where torpedo drops off for attack. May replace SUBROC. Now in R&D.

ASTOR Navy

★ ASTOR, or Anti-Submarine Torpedo, has become a general name for any such item in the Navy arsenal. Thus, the MARK-43, ASTER, and ASROC could all be listed as ASTOR.

ATLAS SM-65 AF

Type: ICBM
prime: Convair
guide: GE/Burroughs/Am. Bosch
power: North American
nosecone: GE
weight: 260,000 lbs.
length: 75 ft.
dia: 10 ft.
range: 5500 naut. mi.

★ Delay in construction of ATLAS pads at Warren AFB. Now sched to be operational Sept '60. Rocketdyne's new MA-3 propulsion system has passed AF test. The lighter, more powerful system will power advanced series "E" Atlas.

BOMARC IM-99 AF

Type: SA
prime: Boeing
guide: Westinghouse
power: A—Marquardt
B—Thiokol
funding: $421.5 million on BOMARC-B in FY 61
speed: Mach 2.7
range: 500 mi.

★ BOMARC B back in production now. AF will not take over Marquardt's Ogden, Utah plant. Score to date: 2 successes, 8 failures. Ten consecutive BOMARC A flights successful.

BULLPUP ASM-N-7 Navy GAM-82-A AF GAM-83-A

Type: AS
prime: Martin
guide: radio command/Republic
power: Thiokol
weight: 250 lbs.
range: 2.5 mi.

★ Now more versatile with proved capability for helicopter launch. Could provide Marine assault troops with additional offensive firepower.

CLAM AF

Type: AS
power: Ramjet
No contracts announced.

Chemical Low Altitude Missile listed in AF missile specifications book. Possible use as target drone.

CLAYMORE Army

Type: SS
range: 40 meters
No contracts announced.

★ This 3 lb anti-personnel weapon is like a hand-grenade in cinamascope. Effective blast area fans out 60 degrees. Highly effective fragmentation.

COBRA USMC

Type: SS
prime: Boelkow Entwicklunger, W. Germany (distrib. U.S.: Daystrom)
guide: wire guided
power: Solid BE
weight: 24.6 lbs.
speed: 191 mph.
range: 1 mi.

Daystrom is turning out 1000 COBRAS a month for USMC. Possibility that Army will buy COBRA very strong now that SS-11 is ruled out.

CORPORAL SSM-A-17 Army

Type: SS
prime: Firestone
guide: Gilfillan
power: Ryan
speed: Mach 3.5
range: 75 mi.

Giving way to SERGEANT. Many CORPORAL birds being used as targets for NIKE family.

CORVUS XASM-N-8 Navy

Type: AS
prime: Temco
guide: Texas Instrument
power: Reaction Motors
range: Over 100 mi.

MILITARY MISSILES, July 1960

★ *New information this month*

★ Will be operational later this year. Several thousand CORVUS birds will be produced with pre-packaged liquid propellant powerplant. Used against shore targets with capability of homing on enemy radar. Will be carried by F8U-2N fighter.

CROSSBOW AF

Type: AS
prime: Northrop
guide: Bendix
power: Westinghouse
range: 200 mi.

This turbojet bird is in dvlpmt by AF to home on enemy radar. All details are highly classified.

DAVY CROCKETT Army

Type: SS
prime: Rock Island Arsenal

★ Will be delivered to NATO in '61. FY '61 production funds: $20.6 million. Bazooka-launched, can be hand-carried or truck mounted. Has low nuclear yield warhead. DAVY CROCKETT has alternate range by switching launching tubes. However, experts feel that range is limited to 3 or 4 miles. Shell characteristics are classified, but educated estimates place weight at 50 lbs; caliber of 5 in; length of 30 in.

EAGLE JAAM-N-10 Navy

Type: AA
prime: Bendix
guide: Bendix/Sanders
power: Aerojet
speed: Mach 4
range: 100 mi.

★ Official announcement expected momentarily on a/c selection as launching platform for EAGLE missile.

FALCON GAR-1, -2, -3, -4, -9, -11 AF

Type: AA
prime: Hughes
guide: Hughes
power: Thiokol
speed: Mach 2+
range: 5 mi.

New dvlpmt by Thiokol permits operation under wider temperature ranges. GAR-3 is operational, SUPER FALCON GAR-3 in test. GAR-2 and 4 are Infrared guided. GAR-9 is radar guided with nuclear warhead. Long range GAR-9 now being cut back in production. GAR-11 soon to be installed on F-102 Delta Daggers, giving them nuclear capability. F-102 will also carry GAR-10 and GAR-2A.

GENIE MB-1 AF

Type: AA
prime: Douglas
guide: Hughes
power: Aerojet
speed: Mach 4
range: 1.5 mi.

Now being carried by F-89J, F-101B and F-106. First operational nuclear warhead air-to-air bird, GENIE is pointed downward at launch, curves up at target. Being replaced by guided FALCON missiles.

HAWK M-3 Army

Type: SA
prime: Raytheon
guide: Raytheon
power: Aerojet
range: 22 mi.

★ Work moving ahead on advanced HAWK with improved performance. Funded for FY '61 at $97.4 million for production.

HONEST JOHN M31, XM50 Army

Type: SS
prime: Douglas
guide: unguided
power: Hercules Powder/Thiokol
range: 12 mi.

★ Improved model XM50, has increased range, is lighter, smaller. FY '61 funding: $22 million.

HOUND DOG GAM-77 AF

Type: AS
prime: North American
guide: Autonetics
power: Pratt & Whitney (J52)
funding: $170 million in FY61
speed: Mach 1.7
range: 500 mi.

Comparable Soviet missile is said to be USSR's KOMET D. Longer range version is two-stage XGAM-87A, now in R&D.

PROJECT HYDRA NAVY

Type: Sea launch platform
Obj: Test feasability of launching missiles from sea platform

★ Tests being made off Point Mugu, Calif. Plans now to use cluster of SPARROW rockets as power supply.

JUPITER SM-78 Army-AF-NASA

Type: SS
prime: Chrysler
guide: Ford Instrument
speed: Mach 10
power: Rocketdyne
range: 1,500 mi.

★ Score to date: 22 successes, 5 partial, 2 failures. 15 birds to Turkey; others to Italian troops. Operational with US Army and SAC. Funding from NASA as space launch vehicle.

LACROSSE SSM-A-12 Army

Type: SS
prime: Martin
guide: Federal Tel.
power: Thiokol
speed: Mach 2
range: 20 mi.

FY '61 production funding: $8.4 million. LACROSSE is operational, now in Germany—with two battalions forming part of the NATO shield. It is multi-purpose in that it can be used against open troops as well as fortified targets.

LITTLE JOHN Army

Type: SS
prime: Emerson Elec.
guide: unguided
power: Hercules Powder
range: 10 mi.

Limited operational use with troops. Funding for FY '60 $38½ million.

LOBBER Army

Type: SS
range: 15 mi.

Designed for attack and supply missions.

LOKI Army

Type: AS
prime: Grand Central Rocket
guide: unguided
power: Marquardt

Helicopter-launched anti-tank weapon. Fixed fins. Needle-nosed warhead.

DATALOG OF MISSILE, SPACE AND DETECTION PROJECTS

MILITARY MISSILES, July 1960

★ *New information this month*

LULU Navy

Type: AU
Prime: In house

★ Navy silent on LULU. The air-dropped ASW nuclear-torpedo is operational and highly classified.

MACE TM-76 AF

Type: SS
prime: Martin
guide: AC Spark/Goodyear
power: Allison (J33-A-41)
funding: $39.8 million in FY 61. No renewal.
range: (B) 1200 mi.

Request funding for MACE, FY '61 totals $31½ million.

MAULER Army

Type: SA
prime: Convair
guide: Raytheon

Anti-missile missile for field use. Truck mounted. Second phase contract has been awarded to Convair: $5½ million. Contract to Burroughs for transportable computer system.

MINUTEMAN SM-80 AF

Type: ICBM
prime: Boeing
guide: Autonetics
power: Tiokol/Aerojet/Hercules Powder
range: 6300 mi.
nosecone: Avco

★ Total of $390 million to be spent on MINUTEMAN in FY '61. First squadron at Malmstrom AFB tagged at $20 million; operational mid '62. Flight testing underway. Studies to test feasibility of railroad launch for MINUTEMAN.

MISSILE A Army

Type: SS
No contracts.
range: 70 mi.

Delay in contract announcement due to proposals to combine MISSILE A with MISSILE B.

MISSILE B Army

Type: SS
No contracts
Range: 10-20 mi.

Will replace LITTLE JOHN. Still in dvlpmnt stage.

MISSILE C Army

Type: SS
No contracts
range: 70-90 mi.

Similar to SERGEANT. In dvlpmnt.

MISSILE D Army

Type: SS
No contracts
Range: Over 500 mi.

Now in early dvlpmnt.

NIKE-AJAX SAM-A-7 Army

Type: SA
prime: Western Electric
guide: Western Electric
power: Hercules Powder
speed: Mach 2.5
range: 25 mi.

★ Conversion of NIKE-AJAX sites to NIKE-HERCULES continuing rapidly in US, Europe, and Far East.

NIKE-HERCULES SAM-A-25 Army

Type: SA
prime: Western Electric
guide: Western Electric
power: Hercules/Thiokol
funding: $111.4 million in FY 61
speed: Mach 3.2
range: Over 75 mi.

Work continuing rapidly on conversion of NIKE-AJAX sites to NIKE-HERCULES. This fine weapons system appears slated for long retention in our anti-aircraft protection arsenal. Nuclear head.

NIKE-ZEUS XSAM-A-25C Army

Type: SA
prime: Western Electric
guide: Bell Telephone
power: Grand Central Rocket/Thiokol
range: 200 mi.

★ Work continuing rapidly to improve electrical and precision components for NIKE-ZEUS, under $18 million transferred from emergency fund. First underground launch was successful. Funding info on request.

PERSHING Army

Type: SS
prime: Martin
guide: Bendix
power: Thiokol
range: 100-300 mi.

FY '60 funding $131.6 million. 4 successes out of 4 firings to date.

POLARIS FBM Navy

Type: US-SS
prime: Lockheed
guide: GE
power: Aerojet
range: 1200 mi.

★ Continued tests aimed at advanced model with increased efficiency. One sub is expected to be operational in '60.

QUAIL GAM-72 AF

Type: AS-ECM
prime: McDonnell
guide: radio command/Summers
power: GE (J85)
range: 200 mi.

Air-launched diversionary missile of extreme sophistication and complexity is valuable aid in protection of SAC bombers.

RAVEN XASM-9 Navy

Type: AS
No contracts announced.
range: 500 mi.

Proposed air-to-surface range: 500 mi. missile now under study. Project appears to be lagging.

REDEYE Army/USMC

Type: SA
prime: Convair
guide: Convair
power: Atlantic Research

Lightweight (18 lb.) infra-red guided bazooka-type missile. Army has high hopes for this relatively inexpensive and effective, easily-carried guided missile that can be fired from a soldier's shoulder, giving him better antiaircraft capability than ever before.

DATALOG OF MISSILE, SPACE AND DETECTION PROJECTS

MILITARY MISSILES, July 1960

★ *New information this month*

REDSTONE SSM-A-14 Army

Type: SS
prime: Chrysler
guide: Sperry Rand
power: Rocketdyne
speed: Mach 5
range: 250 mi.

Now operational with U. S. troops in Europe. REDSTONE with TV camera has been successfully tested and fired in longest overland rocket flight ever attempted. Will use JUPITER C fuel tanks to increase range.

SERGEANT SSM-A-27 Army

Type: SS
prime: Sperry
guide: Sperry
power: Thiokol
range: 75 mi.

★ Contract to Sperry $2 million for continued R&D. FY '61 production funding: $52.1 million.

SHILLELAGH Army

Type: SS
prime: Aeronutronics
guide: Aeronutronics
power: Picatinny Arsenal
range: 8 mi.

Gyro for complex guidance system now being dvlpd by Telecomputing. Ideal for close-in support of troops.

SIDEWINDER AAM-N-7 Navy GAR-8 AF

Type: AA
prime: Philco
guide: Philco/GE
power: Hercules Powder
range: 7 mi.

Extremely popular infra-red homing missile is simple and rugged. SIDEWINDER-1C is advanced model with higher speed and greater range. Advanced model has interchangeable warhead—one with infrared guidance (IRA), the other with radar guidance (SARAH). All weather type SIDEWINDER, to be used on PHANTOM-2 fighter, now in R&D. Earlier models have been purchased by Jap Air Force.

SKY BOLT GAM-87A AF

Type: AS
prime: Douglas
guide: Nortronics
power: Aerojet
nosecone: GE
range: 1000 mi., a/c launch

★ FY '61 R&D budget set at $50 million. May be increased to allow configuration changes. Agreement reached to supply British AF with this 1-stage missile when operational in '64.

SLAM AF

Type: SS
No contracts announced.

Supersonic Low Altitude Missile, big brother of CLAM. Contractors now being selected.

SPARROW III AAM-N-6, 6A Navy

Type: AA
prime: Raytheon
guide: Raytheon
range: 5-8 mi.
power: Thiokol/Aerojet

Work continuing on SPARROW III with additional $26.7 million BuWeps contracts to Raytheon.

SS-10 Army

Type: SS
prime: Nord of France
weight: 33 lbs.
range: 0.9 mi.

Wire guided anti-tank weapon. Operational with U. S. and NATO forces. Used by the French in Algerian battles with success.

SS-11 Army

Type: SS
prime: Nord of France
weight: 62 lbs.
range: 2 mi.

German order of 25,000 SS-11's require full production capability of Nord. Army will cease consideration of this anti-tank weapon in favor of COBRA.

SUBROC Navy

Type: SU-UU
prime: Goodyear
guide: Librascope/Kearfott
power: Thiokol
range: 25-50 mi.

This complex weapons system is launched through a torpedo tube of a submarine or surface vessel. Rising, it flies from 25 to 50 miles through the air, then re-enters the water and homes on its submerged target. Key to perfection of the system is reliability and range of built-in sonar equipment. Work is now continuing along that line.

T-238 Army

Type: SS
No contracts announced.

Short-range mobile poison gas rocket. T-238 will be launched from truck-mounted tubes.

TALOS SAM-N-6 Navy

Type: SA
prime: Bendix
guide: Bendix/AVCO
power: McDonnell
speed: Mach 2.5
range: 65 mi.

Unique in its integral ramjet body, TALOS is now operational aboard the guided missile cruiser GALVESTON.

TARTAR Navy

Type: SA
prime: Convair
guide: Sperry
power: Aerojet/Rocketdyne
speed: Mach 2.0
range: 15 mi.

★ Production increased on TARTAR missile. Will be primary armament of guided missile destroyers; secondary armament of guided missile cruisers. Improved TARTAR now in dvlpmt stage. Will have improved parts and higher energy solid propellant fuel.

TERRIER SAM-N-7 Navy

Type: SA
prime: Convair
guide: Sperry
power: Allegheny/Rocketdyne
speed: Mach 2.5
range: 10 mi.

DATALOG OF MISSILE, SPACE AND DETECTION PROJECTS

MILITARY MISSILES, July 1960

★ *New information this month*

Beam riding missile for use on larger surface ships, TERRIER has new electronic booster like cousin TARTAR. Operational with the fleet. Advanced TERRIER missiles now in increased production.

THOR SM-75 AF-NASA

Type: IRBM
prime: Douglas
guide: AC Spark Plug
nosecone: GE
power: North American
range: 1500 mi.

Now operational. RAF THOR units now complete with 60 birds. In its role as a research vehicle, THOR has served as an effective first stage booster, most capably shown in the THOR-ABLE lunar probe combo.

TITAN SM-68B SM-68 AF

Type: ICBM
prime: Martin
guide: Bell/Am. Bosch/Sperry Rand
power: Aerojet
nosecone: AVCO
range: 5500 mi./9775 mi. (Titan 2)

★TITAN I now fully dvlpd. Martin, Denver work now concentrating on TITAN B, advanced version with storable propellants. It will be launched from underground silos, with a take-off thrust of 400,000 lbs, as compared with 300,000 for TITAN I. TITAN score to date: 12 successes, 2 partial, 3 failures. First squadron will be operational next June at Lowry AFB.

TYPHON Navy

Type: SA-SS
range: 20 and 100 mi.

Under dvlpt. by Navy. New name for SUPER TALOS (long range TYPHON) and SUPER TARTAR (medium range TYPHON).

WAGTAIL AF

Type: AS
prime: Minn-Honeywell
guide: Minn-Honeywell
power: not releasable

This remarkable rocket will be able to follow contours of terrain and change speed in flight. WAGTAIL has been successfully sled-tested.

WEAPON ALPHA Navy

Type: SU
No contracts released.
BuOrd "in-house"

★Operational with the fleet, WEAPON ALPHA is rocket-powered depth charge now installed on destroyer escorts and class 931 frigates. The device will be replaced by semi-long range rocket-launched homing torpedoes, and is therefore already approaching obsolescence.

WHITE LANCE GAM-83B AF

Type: AS
prime: Martin
guide: radio command Republic
power: Thiokol

Larger model of Navy BULLPUP for AF use. Now in dvlpmnt. FY '60 Funding $6½ million.

WILLOW Army

Type: SS
prime: Chrysler

All information still highly classified.

ZUNI Navy

Type: AS-AA
Fuze contract released to Bulova
range: 5 mi.

Operational with carrier based a/c, ZUNI is a folding fin all-weather unguided rocket carried in multiple units. The Douglas AD a/c carry 48 ZUNIs below their wings on combat missions. The weapon is effective against pill-boxes, tanks, gun emplacements and small ships.

SPACE PROJECTS, July 1960

PROJECT ADVENT ARPA

Type: Advanced Communications Satellite
prime: No contracts announced
Obj: Designed to be a global real-time repeater.

Basically same as PROJECT DECREE except for accelerated pace. Polar-orbiting satellites, such as PROJECT STEER and PROJECT TACKLE, may grow as off-shoots of PROJECT ADVENT.

AGENA AF/NASA

Type: Liquid-fueled Upper Stage
prime: Lockheed
Obj: AGENA will be useable as a second stage to ATLAS and THOR missiles. It incorporates a Bell rocket engine similar to that used previously in the HUSTLER vehicle. The AGENA upper stage is used in DISCOVERER, MIDAS and other projects. AGENA and SATURN are part of PROJECT TRIBE.

AGENA B AF/NASA

Type: Liquid Fuel Upper Stage
prime: Lockheed
obj: Deep Space Missions

ATLAS-AGENA B moon shot sched for mid '61. It will TV moon and land instrument capsule to tell NASA about the makeup of the moon. Ford has contract for capsule. Shot with THOR sched this summer by AF. NASA will buy 16 Agena-B launch vehicles for $50 million.

ASTROBEE AF

Type: Space Probe Rocket
Obj: Designed for short-range space-probes

Repeated use of this handy rocket. Many missions planned for future short-range space research missions.

ATLAS-ABLE NASA

Type: Large Booster
prime: Convair/Space Tech Labs
guide: GE/Burroughs/Am. Bosch
power: Rocketdyne/Aerojet
Obj: Designed to orbit 200-lb. satellite around moon.

2 ATLAS-ABLE shots are sched for late '60. Both aimed at lunar orbit. Project going well, with much interest in this combo.

DATALOG OF MISSILE, SPACE AND DETECTION PROJECTS

SPACE PROJECTS, July 1960

★ *New information this month*

CENTAUR NASA

Type: Soft-Land Moon Vehicle
prime: Convair
guide: Minn-Honeywell
power: P&W/JPL
1st stage: Hi-energy Atlas
2nd stage: 2 P&W liquid hydrogen engines
3rd stage: JPL 6000 lb. thrust liquid engine
Obj: Designed to land 730-lb. payload on moon in soft landing. for havy earth satellites and probes to Mars and Venus.

Static tests underway in San Diego. Full firing due early '61.

COURIER ARPA (Army)

Type: Communications Satellite
prime: Philco
Obj: Designed to be delayed repeater satellite, part of PROJECT NOTUS.

Shot now sched for July. Repeated delays in launch schedule.

PROJECT DISCOVERER AF

Type: Stabilized Satellites
Obj: (a) Achieve orbital capabilities of large satellite vehicles.
(b) Dvlp tech for operational military satellite systems.
(c) Recover by use of suitable re-entry capsule for biomedical and other studies.
(d) Execute nonrecoverable advanced engineering tests.
(e) Such other objectives as may be directed.
Tasks: **DISCOVERER** satellites
Prime: Lockheed

Has achieved orbit 6 times in 10 tries and has made successful re-entries. Ejected capsules have not been recovered.

MIDAS Satellites
Prime: Lockheed

Now in test-flight stage of dvlpmnt. Early Warning Satellite dvlpd to spot enemy ICBM launchings by infra-red.

SAMOS Satellites
Prime: Lockheed

Not yet ready for flight. Orig. sched for March.

DYNA-SOAR I AF/NASA

Type: Boost-Glide Orbiting Vehicle
prime: Boeing (for Glider)
Martin (for Booster)
guide: not announced
power: not announced
Obj: Manned glider for orbit and re-entry

★ FY '61 budget: $58 million. AF has also released FY '59 and '60 funds totalling $29.7 million. Boeing now constructing manned glider. Speed up on booster expected. Launch expected late '64. Soviets also working on manned edge-of-space glider.

PROJECT ECHO NASA

type: Inflatable Satellites
Obj: Global communications experiment.

THOR-DELTA as launch vehicle for first attempt of 5 May, postponed due to technical problems in launch.

IRIS NASA

Type: Sounding Rocket
prime: Atlantic Research
Obj: Designed to put 100 lb. payload at 185 mi. altitude.

This rocket apx 13 ft. long and 1 ft. in diameter, will be launched in near future.

JUNO II NASA

Type: Large Booster
prime: Chrysler
guide: Ford Instrument
power: Rocketdyne/JPL
Obj: Attempts to put small payloads in space.

Project to be completed, 1960.

LITTLE JOE NASA

Type: Test Vehicle
prime: North American
power: Thiokol
Obj: Test Vehicle for Mercury
alt: 55 mi.
dist: 200 mi.

★ Last LITTLE JOE shot in July with MERCURY environmental system supporting chimp.

MERCURY NASA

Type: Manned Satellite
prime: McDonnell
Obj: Will attempt to put man in brief orbit, then parachute him in capsule safely to earth.
guide: not announced
power: ATLAS (Rocketdyne)

★ No apparent significant delays in this program. Good PR job by NASA to get public attention away from U-2 disgrace.

MIDAS WS 117L AF

Type: Early Warning Satellite
prime: Lockheed
Obj: Infrared sensing of enemy ICBM launchings.

★ Additional funds for speedup likely once House and Senate make compromise. MIDAS would double our warning time on ICBM launch.

MRS. V ARPA

Type: Maneuverable, Recoverable Manned Space Vehicle
No contracts announced
Obj: Will attempt to place manned vehicle in orbit, then maneuver out of original orbit in space, then return safely to earth.

This project is also known as DYNA-SOAR II. Vehicle will weigh in excess of 20,000 lbs. Launch may be from or to space.

NERV NASA

Type: Nuclear Emulsion Recovery Vehicle
prime: GE
Obj: Measurements of Van Allen Radiation Belts

Initial shots expected Sept '60 with ARGO D-8 rocket. Later shots with SCOUT, not yet on calendar, designed to place 75 lb. cone-shaped payload to alt of 10,000 mi. Early shots to alt of 1800 mi.

NIMBUS NASA

Type: Meteorological Satellite
Obj: Designed to take television pictures of cloud formations and frontal systems.

★ Total of 10 satellites will be launched through 1965—one every 6 months. THOR AGENA-B vehicles will be used. Improved components will be used as available. Invitations to bid will be issued soon.

DATALOG OF MISSILE, SPACE AND DETECTION PROJECTS

SPACE PROJECTS, July 1960

★ *New information this month*

NOVA NASA

Type: Large Booster
prime: Rocketdyne
power: Rocketdyne
Obj: Will build 6-12 million lb. thrust booster for Outer Space

Rocketdyne's 1.5 million lb. thrust engine is heart of this system. NOVA will be cluster of 4 - 6 such engines. Engine in early dvlpmnt now, sched for operation after 1965.

ORION AF

Type: Rocket propelled by nuclear pulses
prime: General Atomic
Obj: Nuclear powered Outer Space Vehicle

In basic testing stage. Apx $2½ million spent to date.

PONTUS ARPA

Type: Material Research
prime: no contracts announced
Obj: Experimentation and dvlpmnt of better structural and power conversion matls for military requirements in surface, air and missile programs.

★ Contracts awarded to Cornell, Pennsylvania, Northwestern Universities. Total funding through 1963; $13.9 million, to establish, equip and operate laboratories. Additional labs may be set up at other universities at a later date.

PRINCIPIA ARPA

Type: Solid Propellants
prime: no contracts announced
Obj: Dvlping new solid propellants with 10-20 percent higher specific impulses.

Project studies to be carried out by universities. Contract negotiations now almost completed.

PROJECT 609A AF

Type: Hyper-Environmental Test System
prime: Chance Vought
guide: Minn-Honeywell
power: Aerojet/Allegany/Thiokol
Obj: Designed to place 200-300 lb. Satellites in orbit.

★ AF will receive 9 SCOUT type vehicles from Aeronutronic.

PROJECT RANGER NASA

Type: Lunar Probe
prime: Jet Propulsion Lab/Aeronutronics
Obj: Hard landing of instruments on moon

ATLAS-AGENA B will carry 800 lb. (RANGER) package to moon. The larger payload will orient the 300 lb. (TONTO) package for hard moon landing.

PROJECT ROVER AEC/NASA

Type: Nuclear rocket
Obj: Prove feasability of nuclear rocket

★ Now in R&D. Lockheed has contract to find adequate atom resistant materials. AEC to dvlp powerplant, KIWI-A and advanced KIWI-A3. NASA to provide frame and test combined power-plant, air-frame. $11 million in funds restored to project ROVER, bringing grand total of $58 million in FY '61 funds. Will see nuclear power-plant by '63, rocket by '66.

SAMOS WS 117L AF

Type: Reconnaissance Satellite
prime: Lockheed
Obj: TV Satellite

★ AF has $200 million in FY '61 for SAMOS. May get additional funds up to $84 million, mostly for program speedup.

SATURN NASA

Type: Large Booster
prime: Convair
power: Pratt & Whitney/Rocketdyne
Obj: Clustered 1.5 million lb. thrust booster for Outer Space Vehicles.

★ Douglas has contract for second stage, with propulsion grant to Rocketdyne for second stage. C-2 model SATURN should be ready in late 1960's.

SCOUT NASA

Type: Four-stage Satellite Launch Vehicle
prime: Chance Vought
guide: Minn-Honeywell
power: Aerojet/Allegany/Thiokol
Obj: Designed to place 200-300 lb. satellites in orbit.

First stage: Modified POLARIS

Second Stage: Modified SERGEANT

Third stage: 3rd stage of VANGUARD (enlarged)

Fourth stage: standard VANGUARD 3rd stage.

Also see AF PROJECT 609. First test of April unsuccessful. Second test expected soon.

SHEPARD ARPA

Type: Tracking System
prime: no contracts announced
Obj: Tracking and data reduction

System will detect and track satellites from Space Surveillance Control Center.

SUNRISE ARPA

PROJECT SUNRISE will make studies of advanced military weapons with special concentration on space delivery.

THOR-ABLE NASA

Type: Large Booster
prime: Douglas/Space Tech Labs
Obj: Designed for deep space probes of lighter payloads than ATLAS-ABLE.
guide: GE
power: Rocketdyne/Aerojet

Good reliability with this combo, as shown by success of PIONEER 5, in giving us valuable outer-space data.

THOR-DELTA NASA

Type: Satellite Launching Vehicle
prime: Douglas
guide: ITT
power: Aerojet/Allegany
Obj: Designed to put small satellites (50-80 lbs.) into orbit around moon.

Use as launch vehicle, with first satellite launches mid '60 on TIROS 2 project.

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TIROS NASA

Type: Meteorological Satellite
prime: RCA
Obj: Reveal certain aspects of the nature of weather

★ Narrow-angle camera malfunction corrected itself, thus we now get both wide and narrow angle pix of cloud cover.

TIROS 2 NASA

Type: Meteorological Satellite
prime: RCA
Obj: Provide info on nature of weather

TIROS 2 will be much the same as its predecessor TIROS 1 with infra-red photo equipment. Its power will be THOR-DELTA, and it is sched for mid '60.

PROJECT TRANSIT Navy

Obj: Astro-Geodetic Navigation Satellite

★ TRANSIT 2A launch of 21 June successful. System now complete with 2 satellites giving continuous navigational info to ships, subs and planes. Especially significant for nuclear subs, allowing them to find position without surfacing.

PROJECT TRIBE ARPA

Obj: Outer Space Vehicles

PROJECT TRIBE is a research, experimentation and systems dvlpmnt designed to obtain at the earliest practical date a continuing family of military space vehicles capable of satisfying the needs for space missions as may be determined by Secretary of Defense from time to time. Guidance, stabilization and control components necessary to satisfactory performance of the vehicles shall be included in the scope of this assignment. The SATURN Task and AGENA Task are part of Project TRIBE.

X-15 AF/Navy/NASA

Type: Rocket-Powered Manned Aircraft
prime: North American
power: Thiokol
Obj: Designed to take man in controlable a/c to fringes of outer space — 250,000 ft. altitude, at speed of Mach 5 (better than 3600 mph.).

★ 6 weeks to 2 months setback anticipated from explosion. Officials relieved that explosion was not result of engine fault.

PROJECT YO YO Navy

Type: Reconnaissance Satellite

Satellite for photo recon. Ship or sub launch.

DETECTION PROJECTS, July 1960

BALLISTIC MISSILE DEFENSE
BMEWS AF

Type: Ballistic Missile Defense Radar System
prime: RCA
Obj: Ballistic Missile Early Warning System designed for 40-minute notice of approaching enemy ICBMs.

Plans for BMEWS England well underway. Construction costs will be paid by the British. Total cost to U.S. for equipment: $81 million.

PROJECT DEFENDER ARPA

Obj: Ballistic Missile Defense

ESAR, TRADEX and PINCUSHION are only part of the entire ballistic missile defense program of ARPA. The GLIPAR studies, (Guide Line Identification Program for Anti-Missile Research) is also a part of Project DEFENDER.

ESAR ARPA

Type: Advanced Warning Radar
prime: Bendix
Obj: Electronically Steerable Array Radar is designed for ground installation to warn of approaching enemy missiles. Multitude of individual calls will give more flexibility than other systems of steerable radar. Part of PROJECT DEFENDER.

GLIPAR ARPA

Type: Study Group for Missile Defense
Obj: Designed to work on future ICBM defense. Called upon by DEFENDER and LONGSIGHT.

PROJECT LONGSIGHT ARPA

Type: Study System in Missile/Space Field
Obj: Recommendations as to projects which should be initiated to satisfy future military requirements. GLIPAR (Guide Line Identification Program for Anti-Missile Research) which was initiated. GLIPAR is now used by both LONGSIGHT and DEFENDER. LONGSIGHT more advanced than DEFENDER.

PINCUSHION ARPA

Type: Advanced Radar prime: Raytheon
Obj: PINCUSHION is a many-frequency radar installation to be located on Kwajalein in the Marshall Islands, initially, as an early warning radar of a more variable type than TRADEX or ESAR.

SAGE AF

Type: Continental air warning and control network
prime: IBM
Obj: Provides a push-button missile defense utilizing a search radar system to locate enemy aircraft and destroy them with integrated BOMARC missiles.

SAGE includes air-borne radar by Burroughs. Off shore planes will give sooner warning of enemy attack by air.

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Obj: TRADEX is a modification of the radar types designed for BMEWS. It has better range.

VELA ARPA

Obj: Research, experimentation and systems dvlpmnt related to the nuclear test moratorium.

VELA Uniform: R&D on sub-surface nuclear explosion detection. Funding for FY '60: $8,535,000.

VELA Sierra: R&D on ground detection of nuclear explosions in space. Funding for FY '60: $1,050,000.

VELA Hotel: R&D on satellite detection of nuclear explosions in space. Funding for FY '60: $300,000.

★ A series of 12 explosions will take place underground despite Soviet objections.

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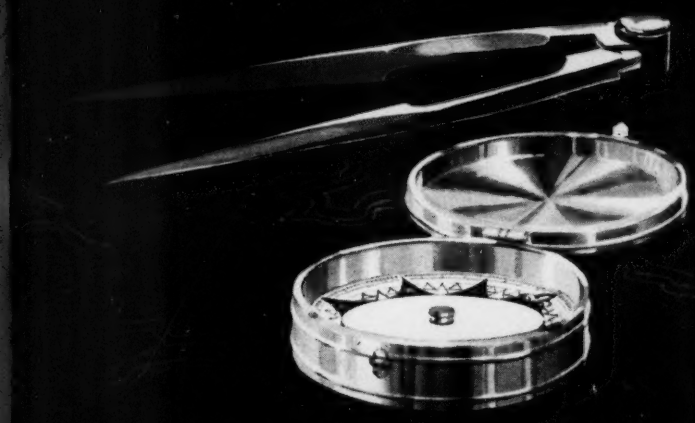

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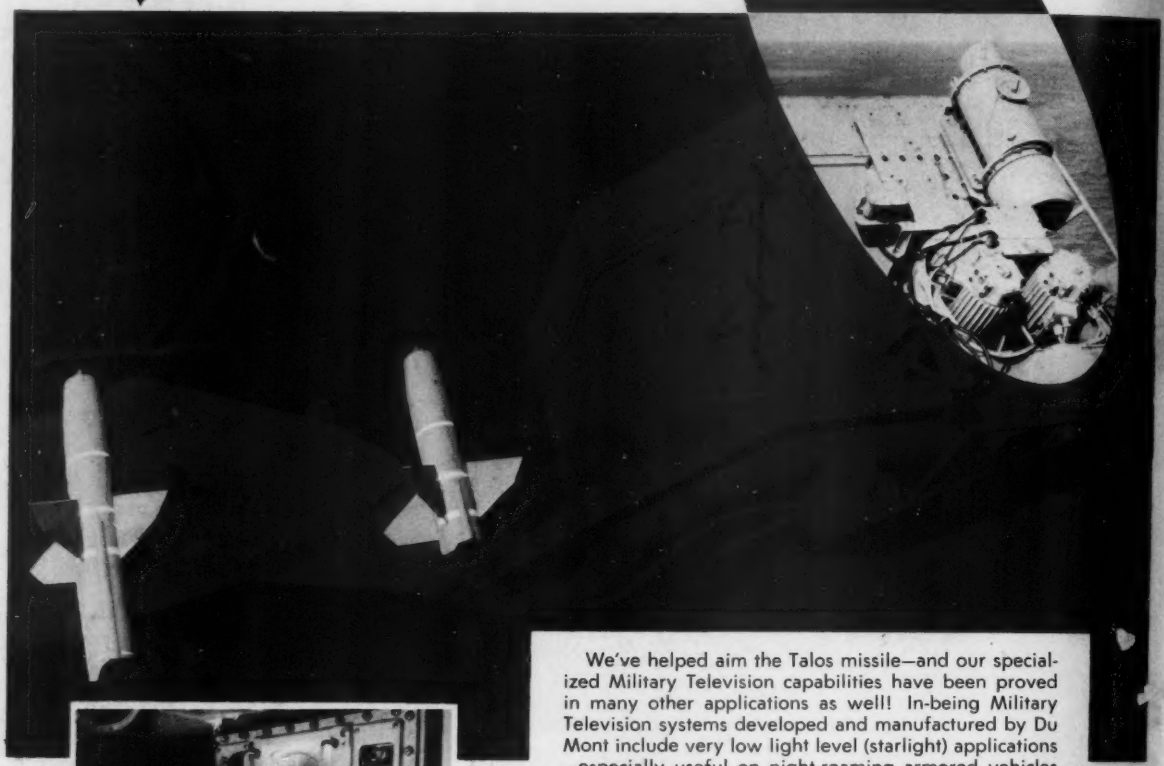

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